



FRIDAY, MAY 18, 1894.

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Contributions.

The office of the Railroad Gazette is now at 32 PARK PLACE, New York.

Lining Track.

OMAHA, Neb., April 22, 1894.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I should like to see discussed some good method for lining track (both curves and straight track) and with special reference to lining out "swings." To line track well is a difficult task for me. I should be pleased to see the views of practical men on surfacing track by use of the blockboard and blocks, giving proper dimensions of board and blocks. I am sure these subjects are very interesting to every track foreman.

J. M. MAGILL.

MR. JOSEPH T. RICHARDS, Eng. M. of Way, Pennsylvania Railroad:—We have given quite a long study to this particular question, and we have arrived at the unanimous decision that there is only one way to properly line track; that is, by an engineer with a transit. This covers both curves and straight-track, and also takes care of the "swings" referred to by Mr. Magill. Stakes are put in by the transit-man as close together as is necessary to enable the track foremen to follow the true alignment, and we have on our main line granite blocks permanently located from which the track men can measure, placing them always at the P. C. and P. T. and around the curves.

MR. W. B. PARSONS.—The best, cheapest and quickest way to line track, either straight or curved, is to have an engineer set out centre stakes along the track to be lined, marking the exact center with a tack, the stakes to project above the top of the ties about two inches, and to be set at distances of not more than 100 ft. Then the foreman should drive a nail with a sharpened point through the centre of his track gauge. All that the foreman has to do is to put his gauge in place at each of the centre stakes and let the men throw the track until the point of the nail is directly over the tack. Between the places so lined he can straighten out the track by his eye. This insures a perfect line, the work being done at one operation, and allows the foreman to be with his men at all times instead of directing them from a distance. If Mr. Magill is on a road where his roadmaster cannot furnish an engineer to set out line stakes, he can probably help himself somewhat on straight track by taking points at the extremities of the points to be lined, measuring carefully to the centre of the track and driving in a small stake at each place, putting a nail in the top of one of them at the exact centre of the track. Then by using this nail like a gun sight on the other stake at the further end, intermediate stakes can be set out fairly close to exact line.

As for surfacing track, the best way is to have an engineer set out grade stakes along one rail, bringing that rail to the level of the tops of the stakes by a small spirit level. But if Mr. Magill cannot get this done, his best plan is to do the best he can by eye and use a spirit level frequently, so as to be sure that his two rails are on the same level transversely. If they are, his track will ride well.

As to Mr. Magill's statement that he finds it a difficult task to line track, he should not be discouraged. To line or surface track by the eye is purely a matter of practice, and no man does it at first trial. In lining up a long piece of track, he must not expect to have his gang throw it exactly right the first time, but he will have to work over it two or three times until he gets it to his complete satisfaction.

The Mexican Central Smoke-Box.

C. P. DIAZ, Mexico, April 30, 1894.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I note the article in the *Railroad Gazette* of the 6th and the letter from Mr. Bell in the issue of the 13th of April,

regarding the arrangement of smoke-box on the Mexican Central engines. I think it is a mistake to say that either Mr. F. W. Johnstone or Mr. J. Snowden Bell designed this arrangement. The design of diaphragm plate and netting was by Mr. J. S. Turner when he was Master Mechanic of the Mexican Central located at Jimulco. Mr. Turner is now Superintendent of Motive Power of the West Virginia Central.

The Bell arrangement of scalloped or cone-shaped netting and perforated diaphragm plate was, after a trial of a few months, found to be unsatisfactory. I was running an engine on Mr. Turner's division at that time and noted the change and the experiments until the design shown in your issue of April 6 was decided on. Engines that would not steam, when equipped with this device were immediately converted into good free steamers, and when Mr. Johnstone received such favorable reports, he decided to adopt the arrangement as standard. To Mr. Bell is due the short front, but to Mr. Turner is due the arrangement of netting and diaphragm plate.

A MEXICAN CENTRAL ENGINEER.

Report of Committee on Pooling.*

This report was read by Mr. Dey, of Iowa, chairman of the committee; the other members were Messrs. Reagan, of Texas; Becker, of Minnesota; Chadbourne, of Maine, and Beddingfield, of North Carolina. The last named concurred in the report, but would not assent to unconditional repeal of the anti-pooling law, and Mr. Becker submitted a minority report, holding that any proposition to allow competing roads to pool earnings would be nothing but an effort to create a gigantic railroad trust, "which is abhorrent to the jurisprudence of this country." The laws forbidding such combinations are fully in accord with the common sense and undivided sentiment of the American people.

Mr. Dey begins with the statement that Section 5, the anti-pooling clause, may be regarded as at variance with the whole spirit of the law; there is nothing preceding it that indicates an intention on the part of the framers of the bill to deprive railroad companies of the right to make their own contracts in their own way, subject to the restrictions of law. The ample provisions made to prevent unreasonable and unjust charges would, if fully enforced, be sufficient to prevent any unjust rate, whether made by the companies by agreement among themselves or by the individual acts of individual companies. The law, broad and catholic in its general character, and based upon equitable principles, intends no wrong to the carrier and permits him to do no wrong to his patrons. It is the natural right of the individual to make such contracts as may suit his interest or his inclination, and while they are in conformity with law no one may restrain him. The same right belongs to the artificial person or the corporation to the full extent of the powers acquired by charter, and, except for the limits, his rights to make these contracts, within such limits, would be undoubted.

Why was this section put in the law? The only reason for it that appears upon the surface is that those who control the business interests of competitive points seek to formulate such conditions, that there will at all times be such struggles for business between the carriers, that by rebate or secret rate they may expect to force some advantage to themselves. This section repealed, the temptation to put upon the non-competitive point a more than fair proportion of the cost of maintaining and operating the roads would be practically removed. It would go further and make the enforcement of the law easier, because it would enlist the railroads in an effort to maintain it, and would insure stable rates, while under the present conditions the railroad interests seem to be largely advanced by a violation of law. Possibly no legislation is necessary after Section 5 has been eliminated. It is questionable whether the position of many railroad managers, that the commission should form a protectorate over a variety of pools is the true policy. If the freight agent is to be taught strict morality, obedience to law, and a respect for contracts, the duty of teaching should not be imposed upon the commission. If there is any doubt about the power to make and enforce such contracts as are here prohibited, a separate law should be passed without any reference to the commission or the commissioner law, giving the roads power to make and enforce contracts among themselves, to collect damages when sustained, and do what individuals might similarly situated.

Any unnecessary restraints on business are injurious. If the legislature, in its wisdom, sees fit to protect the public from the ill effects of the uncontrolled management of railroads, it is well, but when individual and organized efforts are made to compel the railroad companies to violate the law, legislative action should not deprive them of the only practical methods by which this can be prevented. If this matter was better understood the public would still continue to demand reforms, but would hesitate to apply conditions that would make reforms impracticable.

The conviction is forced upon the mind of every one who has carefully watched the policy of railroad companies for the last twenty years, particularly at the large business centers, that if these vast properties are to be preserved and to earn for the stockholders remuneration for their investment, they must eventually be honestly managed upon the principles laid down in the Interstate Commerce Law, and the sooner this determination is reached the better for their interests. Evasion and sharp practices can not always succeed and will eventually react. Why this is not recognized and acted upon when the consequences are so apparent, is a question difficult of solution.

The report then goes on to discuss the long and short haul section of the Interstate Commerce Law. Section 4 is of more practical value in affording equal and exact justice than any or all the other sections combined, and it is to be regretted that a healthy and strong rule of action has been partially compromised by the insertion of the words "under substantially similar circumstances and conditions," and that the commission was given authority to allow the rule in special cases to be abrogated.

Probably greater discriminations have been made than would ever have been attempted had not the explanations alluded to been placed in the law. The absurdity of the judicial interpretation of the word "line" is here referred to. It has been estimated that only one-quarter of the population of this country lives near competing points so as to get the benefit of the free competition which the anti-pooling law stimulates.

It is true that with the broadest liberty to make contracts, and with all freedom for pools, still the rates are often cut. This may be, but you have, to aid in sustaining the rates, the forces of all the railway interests, and they are generally able to deal with these matters fully as well as a commission or a judicial tribunal. It would

*From proceedings of Sixth Annual Convention of Railroad Commissioners, at Washington, May 8, 1894.

seem that Section 5 was enacted in the belief that if the carriers were able to destroy each other that the public would permanently gain by their contests. The Interstate Commerce Commission is not composed of experts in this branch of railroading, and there is no objection to giving the companies the broadest latitude in carrying out pool arrangements.

The report then criticises the clause of the law (Section 22) which permits the carriage of freight free for the Government. In case of war or national calamity all property would yield its rights, but in ordinary times Congress should not discriminate in favor of the Government, which is not a regular and constant patron.

The Train Stealers on the Missouri Pacific.

The exploit of the Coxeyites on the Northern Pacific, which was reported in the *Railroad Gazette* of April 27 and May 4, has been matched on the Missouri Pacific, though in the latter case the freebooters succeeded in traveling only about two-thirds as far before they were stopped. Some interesting notes showing how this high-handed defiance of the law is carried on are found in the press dispatches of May 10 from Scott City, which we copy below. The ease with which the railroad officers are defied will be understood when it is remembered that this road, like the Northern Pacific, has very little business. There is only one passenger train each way during the twenty-four hours.

"General" Sanders and his "Industrial" army, after an exciting trip of 214 miles eastward from Pueblo on a stolen train, have surrendered to the United States authorities. The men stole a Denver & Rio Grande engine and six Missouri Pacific coal cars at Colorado City Tuesday night, and started out on the latter road. After a run unprecedented in Western railroad history, and skillfully avoiding officers of the law, railroad officials and obstructions placed in their way, they arrived at Scott City late this afternoon.

The men met and built tracks around two obstructions yesterday. When they reached the third at Chivington, Col., last night, they were utterly worn out by their long ride and exposure, and went into Chivington for rest and refreshment, abandoning their train for the time being. Later, however, hearing that a wrecking train was on the way to remove the obstruction to allow the resumption of traffic, they returned on handcars to the deep cut and awaited the arrival of the company's crew. When the train arrived, Sanders signified his willingness to help in removing the cars which had been derailed and thrown across the track, and in a drizzling rain the commander and his men worked for three or four hours. The obstruction removed, Sanders coolly signalled "All aboard!" and forcing the work train before him, proceeded on his way eastward with his original train. When the men reached Chivington the work train was sidetracked, and Sanders being informed that no further attempt would be made to hinder his passage eastward, they started forward, arriving at Horace, Kan., about noon. Here a west-bound passenger, which had stood for 36 hours, was waiting for the stolen train to pass.

After Engineer Cosgrove coaled his engine and took water at the tank the stolen train started out just as the east-bound mail from Pueblo entered the Horace yards. This changed the situation. The west-bound passenger was released and started for Pueblo. Cosgrove slipped back upon the siding while Sanders ran up to the station to notify the conductor of the passenger train to go ahead. In the yards stood five or six locomotives on their way back to Pueblo. Cosgrove audaciously selected the best passenger locomotive in the lot, with which he replaced the stolen Denver & Rio Grande switch engine. There was a long delay. The officials did not want the passenger to leave ahead of the stolen train, as that would interfere with the plans laid to entrap Sanders at Scott City, but Sanders and Cosgrove were familiar with railroad rules, and they declined to make the first move.

Finally the officials ordered the passenger train to go ahead. The coal-car special followed just ten minutes later. The mail entered Scott City ten minutes ahead of the coal-car tourists.

Meanwhile the special bearing the United States deputy marshals and H. G. Clark, General Superintendent, had been racing westward. Rails had been ordered removed just west of this city, as there the scene of contest, if there was to be any, had been planned. The coming of the east-bound mail changed these plans, however, and the rails were relaid.

Just as the Coxeyites reached Scott City the west-bound mail, that had been held there, was ordered west. When the men saw this new move upon the part of the railroad people they quickly retreated down the line. This action was telegraphed to Superintendent Derby in Pueblo, and he wrote a brief order to a crew at Selkirk to ditch a locomotive in White Woman's Cut, four miles away. But here again the Coxeyites fooled the railroad people. They only dropped back to Modoc, ten miles, where they let the west-bound mail pass them, and then they returned to Scott City, where they arrived shortly after 5 o'clock. By this time the special, with deputies had reached Scott City. Sanders asked for a conference, which was granted. The result of this was that a half hour was given for Sanders to decide what course he would choose to take. He returned to his men, and after a parley the men decided to surrender. The entire delegation was taken east at midnight to answer to the charge of obstructing the mails. This movement will bring them nearer Washington, they think. They are happy to think that they had crossed 214 miles of almost barren plains with their stolen train before their progress was finally arrested.

A French Express Compound.

The Paris, Lyons & Mediterranean Railroad has within a year or two put in service a new style of express compound locomotive which was very completely described in the *Revue Generale des Chemins de Fer* early in 1893, from which the following description and data are taken.

These compounds, known as the 1892 type, are interesting on account of weighing less and being at the same time more powerful than the same style of compound built previously by this road and known as the 1888 type. The engines have four cylinders and four coupled driving wheels, with either a four-wheel or two-wheel leading truck. The high pressure cylinders are placed outside of the frames and between the front driving wheel and rear truck wheel and are connected to the rear driving wheels; the low pressure cylinders being between the frames over

in curving or by lateral displacement, the truck tending to return to a position parallel with the longitudinal axis of the engine when free to do so. Lateral motion is limited to .59 in.

The following are the principal dimensions of the engine with four-wheel truck :

Grate surface.	24.97 sq. ft.
Firebox { Length inside at grates.	87.8 in.
{ Width "	40.95 "
Tubes—Serve, Ribbed.	
" Material.	steel.
" Number.	133
" Outside diameter.	2.56 in.
" Thickness of.	.098 "
" Length between sheets.	9.84 ft.
" Number of ribs in each.	
" Height of ribs.	.47 in.
" Thickness.	.098 "
Heating Surface—Firebox.	112.16 sq. ft.
" Tubes.	1478.79 "
" Total.	1590.95 "
Boiler—Diameter of cylindrical part.	51.97 in.
" Thickness of shell sheets.	.57 "
" Center line above rail.	7.38 ft.

	High pressure.	Low pressure.
Cylinders—Number	2	2
" Diameter	13.39 in.	21.26 in.
" Stroke	24 " "	24 " "
" Dis'e center to center	84.25 " "	23.23 " "
Valve motion	Walschaert.	Special.
Valves	Allen.	Allen.
Valve travel max.	4.8 in.	6.14 in.
Outside lap.	1.02 " "	1.36 " "
Inside "	None.	None.
Steam Ports—Length	9.45 in.	13 in.
" —Width	1.41 " "	1.92 " "
Exhaust Ports—Length	9.45 " "	13 " "
" —Width	3.15 " "	3.94 " "
Volume of receiver.		9.18 cu. ft.
Driving wheel base.	106.27 in.	
Truck " "	78.74 " "	
Total " "	271.66 " "	
Driving wheels diameter.	78.74 " "	
Truck " "	39.37 " "	
Weight in working order on truck		39,150 lbs.
" " " " forward d'v'g wheels.		33,360 "
" " " " rear " "		33,090 "
Total		105,600 lbs.

Foreign Practice in Brake Shoes

The accompanying illustrations serve to show the current practice in Germany and England in the matter of brake shoes.

Fig. 1 represents the standard type used on the Prussian State Railroads on their 15-ton, goods cars. About 6,000 tons of these and similar shoes are used per year on an equipment consisting of about 10,000 locomotives, 16,000 passenger cars and 220,000 freight or goods cars.

In figs. 2, 3, 4 and 5 are shown the standard brake blocks used on the North Eastern Railway of England. Fig. 2 is that used on passenger carriages; fig. 3 the standard for locomotive service, and fig. 4 the standard brake block for tenders. Fig. 5 shows the brake used on freight wagons. This last differs from the others in its mode of suspension and also in being provided with

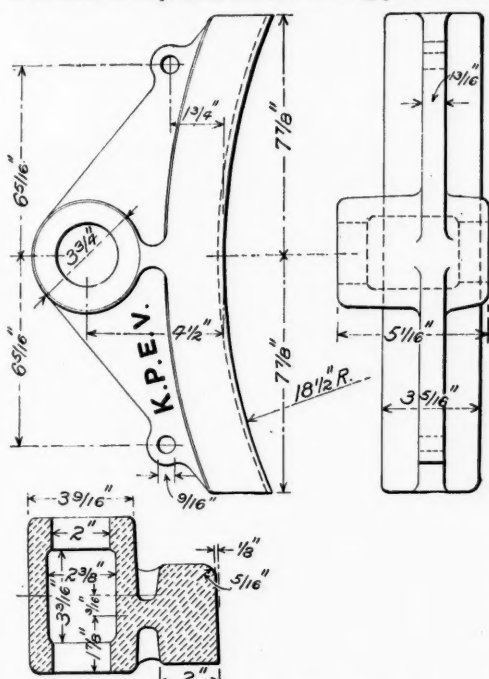


Fig. 1—Brake Shoe, Prussian State Railroad.

a lug intended to hook over the wheel flange in such a manner as to hold the shoe in place against the wheel tread. The shoes used on the North Eastern Railway vary in amount from 1,750 to 2,000 tons a year.

It will be noticed that none of the shoes shown are

intended to bear on the wheel flange or grip the tread of the wheel at the points least worn by contact with the rail. All are so made as to combine the functions of shoe and head, and are made of plain cast iron.

Air-Brakes and Train Efficiency.

The question of whether the efficiency of the freight train service has been improved by the use of cars equipped with air-brakes can be easily answered in the affirmative.

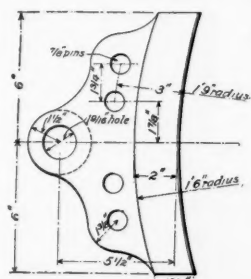


Fig.2 CARRIAGE BRAKE BLOCK

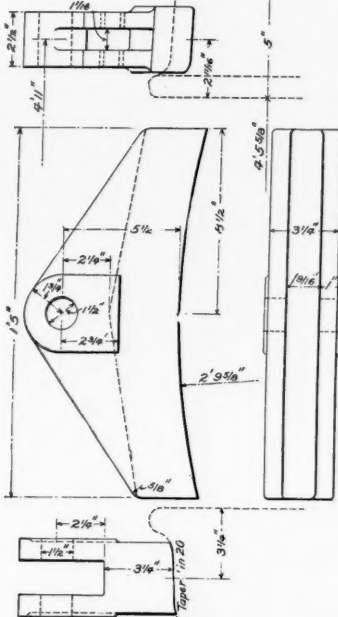


Fig.3 ENGINE BRAKE BLOCK

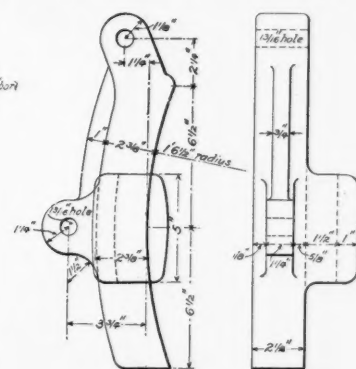


Fig.5 WAGON BRAKE BLOCK

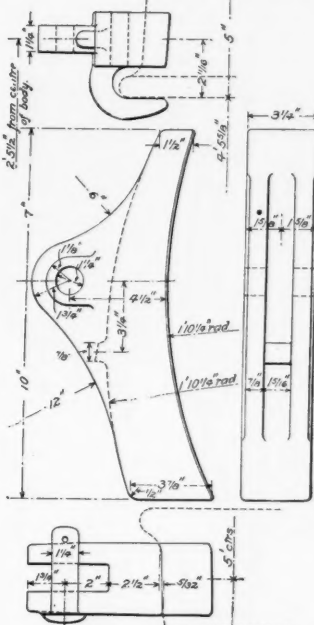


Fig.4 TENDER BRAKE BLOCK

Brake Blocks, North Eastern Railway.

but to determine with any degree of accuracy the proportion of increase in speed of trains over those not using air-brakes cannot be so easily answered, especially where engines are uniformly loaded up to their full capacity. The increase in the volume of traffic and the increased load per axle has been so great that in many cases comparisons cannot be made with any degree of fairness. There is no doubt that freight trains having air-brake cars in service are better handled, and run over the road with less trouble than formerly. The increased confidence felt by the crew from the knowledge that they can quickly control their train in close quarters, especially when following another train, will materially tend to increase speed.

If we have all the air-brake cars in a train together, they being as a rule equipped with the vertical plane coupler, the number of damaged cars is materially lessened. The average number of broken trains has also been largely reduced by the use of air-brake cars. Where a train is slackened by a cautionary signal the crew apply hand-brakes both at the front and the rear end of the train; and then when the engineer starts up again the train is liable to be broken before the brakes can be released by hand; but with air the engineer, having control of his train, can start it without much danger.

In trains hauling slow freight, speed is not so much sought after as tonnage, and this fact prevents a comparison between trains of this class. But where speed is sought after and the tonnage is a secondary consideration, comparison can be more safely made.

The Pittsburgh Division of the Pennsylvania Railroad, from Pittsburgh eastward to Altoona, is a good place to judge whether the use of air-brake cars tends to higher speed or not, and an officer of that road has given us the

of 480 ft. To Derry, 46 miles, there are numerous ascending grades of 53 ft. per mile, but with frequent down grades also. From Derry to Conemaugh there are no ascending grades steeper than 30 ft. per mile (and the one of that rate is short) except for the last 7 miles. From Conemaugh eastward 13 miles, the ascending grade is from 30 to 42 ft. per mile most of the way, and for the remaining 12 miles to Gallitzin the summit of the Alleghenies, it is 40 ft. most of the way.

Trains of slow freight are rated at 40 cars of 40,000 lbs. capacity to one class "R," consolidation, engine; stock trains 35 cars, and meat trains 25. From Pittsburgh to Derry an extra engine is used and also from Conemaugh to Gallitzin. Westbound trains have two extra engines from Altoona to Gallitzin and one extra engine from Derry to Pittsburgh.

The extra engine is generally coupled to the rear of the train, but with slow trains this is dependent entirely on the number of air-brake cars in use. On stock trains and meat trains the helper is placed ahead because the majority of the cars are equipped with air. The engine next to the train has control of the air. All trains are run as extras, but the stock and meat trains can use the main tracks at all points, in preference to trains hauling freight of an inferior class. The crews consist of engineer, fireman, two brakemen, one flagman and a conductor. A separate track is set apart in the yard at Pittsburgh on which air-brake cars are drilled, and an effort is made to give each train at least 10 cars with air-brakes. This number is now often exceeded.

No satisfactory information can be derived from the train sheets as to increase of speed, because unknown elements enter so largely into the calculation. Train sheets

COMPARATIVE TRAIN SHEET OF FREIGHT TRAINS, PITTSBURGH DIVISION, PENNSYLVANIA RAILROAD.

ENGINE.	DATE.	CLASS OF FREIGHT TRAIN.	VI		CM		WK		20.5 D		22.7 MF		27.1 RG		30.6 SW		39.8 KR		44.9 DR		54.3 BH		57.6 VY		63.5 NF		71.7 SQ		78.8 C	
			Pitts'g, 28 St		E. Liberty.		Wilkins'g		Irwin.		Manor.		Radeba'gh		Greensb'rg		Latrobe.		Derry.		Blairsv. I.		Bolivar J.		NewFlor'n'ce		Con'm'gh			
			A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D
1315	1889	Stock.					12.47	12.47	1.34	1.34	1.40	1.40	1.58	1.58	2.07	2.07	2.32	2.37	3.12	3.23	3.39	3.39	3.48	3.48	4.02	4.02	4.27	4.27	4.54	4.54
1606	1894	Stock.					12.53	12.53	1.34	1.34	1.40	1.40	1.53	1.53	2.02	2.02	2.22	2.22	2.50	2.50	3.04	3.04	3.15	3.15	3.53	3.53	4.17	4.17	4.41	4.41
1300	1889	Meat.	10.15	10.33	10.33		10.40	10.51	11.33	11.33	11.39	11.39	12.09	12.09	12.20	12.20	12.48	12.48	1.14	1.28	1.59	1.59	2.09	2.09	2.22	2.22	2.52	2.52	3.15	3.15
1365	1894	Meat.	11.52	12.15	12.15		12.22	12.22	12.57	12.57	1.03	1.03	1.30	1.30	1.40	1.40	1.10	1.13	2.37	2.45	2.59	2.59	3.09	3.09	3.22	3.22	3.38	3.38	4.02	4.02
1307	1889	Slow.	9.41	9.49	9.49		9.53	9.53	11.20	11.20	11.26	11.26	11.33	11.33	11.48	11.48	1.12	1.28	2.14	2.14	2.33	2.33	2.45	2.45	3.16	3.16	3.36	3.36	3.58	3.58
1391	1894	Slow.	9.09	9.24	9.24		9.31	9.31	11.18	11.18	11.30	11.30	11.18	12.18	12.30	12.30	1.02	1.02	1.38	1.55	2.18	2.18	2.32	2.32	2.58	2.58	3.31	3.31	3.58	3.58

NOTE.—All the locomotives shown in the table are of the Pennsylvania class "R" standard. They have four pairs of driving wheels, coupled, 50 in. in diameter, and there is one two-wheeled truck. The engines weigh, in working order, 57 tons, and the steam pressure is 140 lbs. per sq. in. The total heating surface is 1,731 sq. ft., and the area of the grate is 31.1 sq. ft.

for the first week in April, 1889, compared with those of the same week in April, 1894, show that instead of there

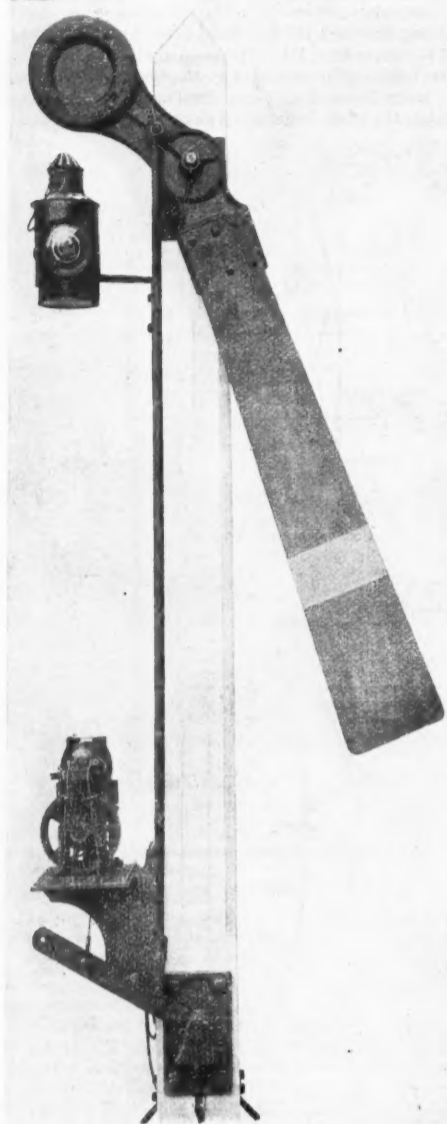


Fig. 1—National Semaphore for Automatic Block Signals.

being any increase in speed it seems to be the reverse. An average was taken of the total number of trains having slow freight from tower "D" to "C," and showed that the trains in 1889 made the run in 4 hours and 51 minutes, while in 1894 they were 6 hours and 5 minutes.

The difference in time between stock train and meat trains is very little better. The average time in 1889 made by stock trains from "W K" to "C" was 4 hours and 33 minutes, and in 1894 4 hours, 27 minutes. Meat trains in 1889 took 5 hours, 55 minutes from Pittsburgh to "C," and in 1894 5 hours, 20 minutes.

The average number of trains that passed a certain point, "N F" Tower, for 24 hours in the first week of April, 1889, was 44, while in 1894 for the same time there were 59, which will help to explain the small difference in time made. These averages were not taken any further east than Conemaugh as that is the end of the moderate grade.

In 1889 practically none of the cars were equipped with air. The class "R" engines had come generally into use.

The comparative train sheet shown herewith gives the movement of the three different classes of trains for 1889 and 1894. By comparing the runs made by the different trains it will be found, deducting the time lost in taking water, by trains ahead and in lying off for passenger trains, that the rate of speed for engine 1,315 from "W K" to "C" was 19 miles an hour, and the best time made between "D R" and "B H" 35 miles an hour. Engine 1,606 made the same distance at the rate of 22 miles an hour, and made between "D R" and "B H" at the rate of 40 miles an hour. No. 1,300 was 4 hours, 11 minutes from "V I" to "C," averaging 19 miles an hour. From "V Y" to "N F," 5.9 miles, the time was 13 minutes or 27 miles an hour. No. 1,365 was 3 hours and 45 minutes for same distance, and made 9.4 miles between "D R" and "B H" in 14 minutes or 40 miles an hour. No. 1,307 from "V I" to "C" used 5 hours, 34 minutes; best time 30 miles an hour, "V Y" to "N F." No. 391, same distance, used 5 hours, 45 minutes, and made 25 miles an hour from "D R" to "B H." No deduction was made for the last two trains except that which is shown on the sheet, as no definite information can be given.

If high speed is desired, trains will have to be rated so that the engine can make the time, and so that the crew shall have the knowledge that they will "get the track," which is done either by running the train on a schedule, or, better, as a section of a passenger train. When this is done the speed of trains having air-brake cars in use, will differ very little from that of those not having them. Especially is this true if the crew ride out on their trains and not in the cabin car.

The Lattig Automatic Semaphore Motor.

The engravings which are published herewith show the apparatus designed and patented by Mr. J. W. Lattig, Superintendent of Telegraph of the Lehigh Valley Railroad, for operating a standard outdoor semaphore in connection with an automatic block signal system by an electric motor. This apparatus is made by the National Switch & Signal Co.

It has long been considered very desirable to accomplish what the Lattig system does and many attempts in this direction have been made. Although there have been difficulties in the way of using a semaphore operated by electricity, much skill has been developed in this line and in the manufacture of then necessary apparatus, so that now great success and reliability are claimed for such apparatus.

The illustrations clearly show the construction and method of operating this automatic semaphore. As will be seen, the standard semaphore, counterweighted in the usual manner, is employed. In the method of installation recommended by the company, both the track battery and the local battery working the signal are normally at rest, the circuits being open. The signal therefore stands in the danger position and is held there by the counterweights. When a train approaches a point where it is desirable to obtain the signal indication (and this point may be placed at any convenient distance before the signal is reached), an extension of the track circuit, either by overhead wire or cable, is closed by a contact-making device, either electrical or mechanical. Provided the block ahead is unoccupied, the track circuit being thus closed, a current is transmitted through the rails from the extreme end of the block in advance and energizes a relay controlling the local battery circuit, which, being thus closed, the local battery current at once passes through the motor, setting it in motion. This apparatus is capable of generating one-eighth horse power, or say 100 watts, and is so geared as to wind up the wire rope on the drum connected with the large gear wheel seen in the illustration. This rope, of phosphor-bronze wire, lifts the balance lever on the semaphore post, and, by means of the vertical rod connection, pushes the semaphore into the position indicating safety. By an ingenious arrangement of worm gear, the motor circuit is then shunted to a releasing magnet, which grasps a circular armature, upon the spindle of which a small pinion slides, and this being thus firmly held stationary, prevents unwinding of the rope so long as the track circuit energizing the relay remains unbroken. When, however, this circuit is interrupted or the current is short-circuited by the train entering the block so as to de-magnetize the relay, the releasing magnet is de-energized, and the motor circuit broken at the same time. This allows the semaphore arm to return to its normal (danger) position, the gearing and motor revolving backward as the rope unwinds from the drum. An ingenious short circuiting device cushions the motor and prevents any racking wear from the sudden stopping of the signal when it reaches the danger position.

motor mechanism, M is the motor, on the left of which is seen the commutator, CM, and on the right the releasing magnet, RM, with the circular armature AR attached to the sliding pinion, Z71, which is feathered on the shaft of the motor so that a free movement of the armature AR is permitted. When the current is shunted to the releasing magnet, RM, the pinion Z71 is held from rotating by the armature AR being firmly attracted to the magnet, thus preventing a backward movement of the gearing while the signal is being held in the clear position. The pinion Z71, whenever the motor is set in motion, operates, through the gears Z73, Z72 and Z74, the drum D, upon which the rope R is wound. When, by the closing of the track circuit, the motor winds the rope upon the drum D, at the same time the worm gear W, by means of the arm Z68 and the rod to which it is attached, withdraws the contact S from between the springs CC, thus opening the motor circuit and at the same time shunting the main battery current to the releasing magnet RM, which, as above stated, acts like a pawl to hold the gearing motionless while the semaphore shows "clear." The action of the batteries thus only continue during the interval of time elapsing from the moment when the train closes the extended track circuit until the signal is passed and the relay current is short-circuited by the entrance of the train upon the block. The signal may either be located at the entrance of the block section, directly opposite the insulation between the blocks, or it may be placed a certain lap distance within the preceding block, so that the return of the signal to the danger position need not take place until the train has passed a certain prescribed distance beyond the signal post, which of course, so far as the engineman is concerned, marks the limit of the block section.

The automatic semaphore has been given a thorough test during the past winter on the Central Railroad of New Jersey with satisfactory results. Eight to twelve cells of Edison-Lalande battery are used, according to power and efficiency needed, the maximum speed of operating the signal being two or three seconds, when the motor circuit is shunted and but a fraction of the current used for the holding magnet until train reaches the signal.

Air Pump Repairs.

In recent numbers we have published most of the papers presented at the recent Convention of the Association of Air Brake Men. What follows is the report of Mr. Otto Best, of the Nashville, Chattanooga & St. Louis, and Mr. C. A. Sanderson, of the Missouri Pacific, of the Committee on Air Pumps.

When air pumps are to receive a general overhauling they should be dismantled and such parts as have an accumulation of grease and dirt upon them should be put into a vat or tank containing a strong solution of lye, and allowed to soak until all grease and dirt has been removed, after which all ports and passages should be thoroughly blown out with steam until they are perfectly clear. The solution of lye should be heated to a boiling point by means of a steam coil placed inside of the vat. Steam should not be admitted direct into the vat, as with this method the solution is rapidly diluted.

We will first take up the 6-in. pump as manufactured by the Westinghouse Air Brake Co.

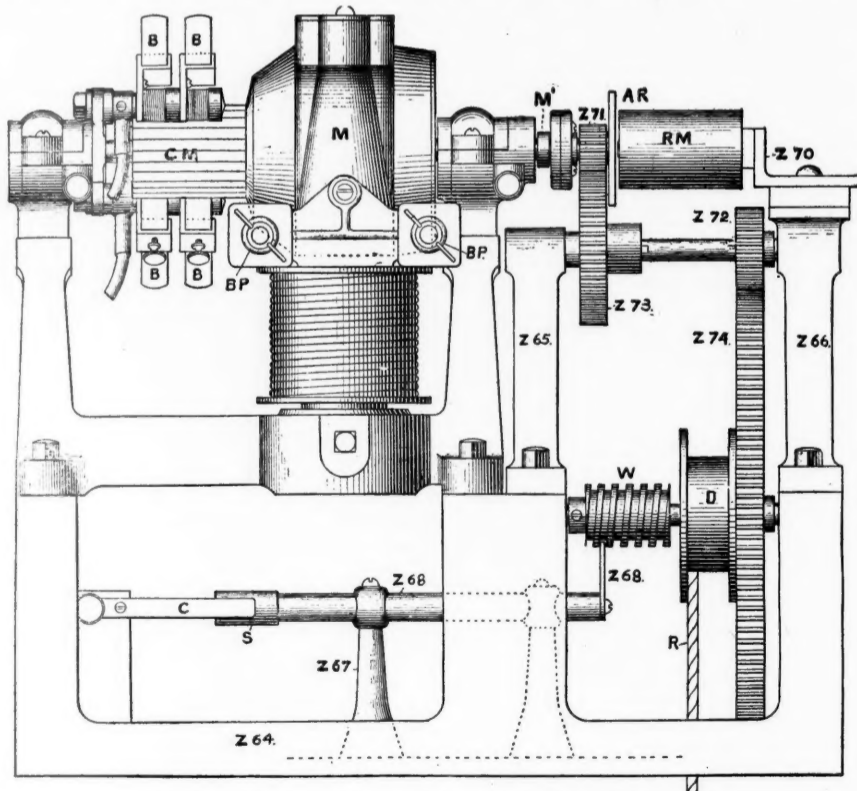


Fig. 3—Front Elevation of Electric Motor for Semaphore Signals.

Reversing Cylinder.

The top head plays a very important part in the action of the pump. The practice of facing off the bottom of the reversing cylinder in order to lower it into the head and thereby cause it to fit is one that should be discontinued, as it changes the relative position of the reversing piston and the main valve in proportion to the amount of metal taken off the cylinder. The better plan would be to order extra large reversing cylinders from the manufacturer and fit the cylinder to each individual head. A neat fit should be made of the reversing cylinder the entire length of the

tion, the motor thus working against itself and retarding its momentum. Everything being now in normal position, all circuits open and the semaphore at danger, no further movement takes place until the approach of the next train, when, if the preceding train has not cleared the block which the signal controls, no clear signal is obtained, although the train may have closed the track circuit at the point where the operation of the signal is effected.

In the illustration, Fig. 3, showing the elevation of the

taper, and it should be held firmly in place by its cap nut. It is advisable that where a cylinder is worn so as to form a shoulder or becomes larger at one point than another, or the hole in the bottom of the cylinder becomes very much enlarged, that cylinder should be discarded and a new one of standard size substituted. Enlargement of the hole in the bottom of the reversing cylinder causes a slight blow through the oil-way located in the side of the cylinder. As heretofore stated, the reversing cylinder cap should hold the reversing cylinder firmly in its place. It should at the same time form a steam-tight joint on the top head.

Reversing Pistons.

It is not uncommon to find the stem of the reversing pistons altered in length; this is a bad idea. Some pump men increase the diameter of the stem of the reversing

to insure a steam-tight joint on the end of the reversing valve bushing in order to prevent the pump from blowing. The joint between the cap and the top head should be steam tight also. The cap should fit the reversing valve stem neatly in order to prevent the pump from blowing.

Reversing Valve Stem.

The reversing valve stem should make a good joint where it passes through the bushing, also where it enters the cap nut; otherwise a blow on the up stroke of the pump will result, and the pressure in the reversing valve chamber will be reduced. If the reversing valve of the stem becomes worn to any great extent between the shoulders or becomes reduced in diameter to any great extent, either where it passes through the lower end of the reversing valve of the bushing or at the upper end

the main valve, should only be sufficient to prevent the lower packing ring from getting out of the bushing when the main valve has struck post. The Westinghouse Air Brake Co. has recently reduced the thickness of the lower nut on the main valve $\frac{1}{8}$ in., and that of the upper nut $\frac{1}{4}$ in., so as to give $\frac{1}{8}$ in. clearance between the valve and the stop when the reversing piston is bottomed on its cylinder.

Steam and Air Cylinders.

If the steam or the air cylinder is worn at all out of round, or worn smaller at one point than at another, it should be rebored. In reboring both the steam and the air cylinders of a 6-in. pump, it is preferable to increase the original diameter $\frac{1}{8}$ in., thus having all the cylinders for the 6-in. pump either 6 in. or 6 $\frac{1}{8}$ in. in diameter. If a second reboring is found necessary, the cylinder should be consigned to the scrap pile and a new 6-in. cylinder substituted. In boring out cylinders, machine hands should be careful that they are bored central.

Main Steam Piston and Its Packing Rings.

The original piston and packing rings should never be used in a re-bored cylinder, but a new piston and packing rings fitted to the cylinder. The main steam packing rings should be put in the very best condition; otherwise the pump will blow, and the back pressure will be materially increased. It is of the utmost importance that the rings fit the cylinder properly. As is generally known, when a packing ring is cut, that portion of it nearest the ends has a tendency to remain straight when the ring is reduced to the size of the cylinder, resulting in a poor fit for almost one-third of the circumference. To obviate this trouble and thereby secure better fitting rings, it is customary either to file off the outside of the rings near the ends, or to turn them up in a lathe after the rings have been cut. Either of these methods will answer, as long as the rings are made to fit the cylinder properly. Rings should be made to fit their grooves neatly, but not so as to bind. Rings very much open at the ends have lost their tension and are likely to fail to set out as they should, and are quite sure to permit steam blowing by; this being the case, they should be discarded and new ones substituted. Peening of rings should never be practiced. Rings should not be cut square, but should lap at the ends.

Centre Piece.

The centre piece needs more than passing notice. The glands should be as close a fit on the piston rod as possible without binding. When the piston rod has been turned down in order to true it up, new glands should be fitted to it, and if the rod is too small for the stuffing boxes, there should be placed in the bottom of the boxes a bushing ring to prevent the packing from working through into the pump. Main piston rods should be kept true by frequent turning.

Main Air Piston and Its Packing Rings.

The main air piston and its rings deserve all the care than can possibly be bestowed upon them. A first-class job should be made of the pistons and piston packing rings of air cylinders. Where the cylinder has been re-bored, the old piston should not be used, but a new piston and rings fitted to the cylinder. The main air piston rings are the most vital part of the pump and are too often overlooked. Bad rings will result in pump heating, pounding and failing to compress the requisite amount of air. A simple test to ascertain the condition of the air piston packing is to raise the pressure to about 70 or 80 lbs., and then at moderate speed note if suction continues through each receiving port the entire length of the stroke. If suction continues to the end of the stroke it is satisfactory proof that the packing is all right. Poor results are obtained more often because of bad rings than from any other source. Packing rings should fit the grooves in the piston neatly.

Air Valve.

The correct lift of air valves contributes very largely to the success or failure of the pump to perform the duty required of it. By experience it has been determined that for a 6-in. pump the receiving valve should have $\frac{1}{8}$ in. lift, and the discharge valve $\frac{1}{4}$ in. lift. Precaution should be taken that these valves have no less lift than that specified above. All valves should be re-ground to their seats. The practice of putting in a false seat for the lower discharge valve is one that is usually unsatisfactory, as it invariably becomes loose. The habit of putting two thin nuts on the bottom end of the main piston rod to keep the air piston from getting loose is one that can be followed to good advantage. This method of securing the main air piston to its rod would seem more efficient than where one nut and a pin is used.

8-in. Pump.

The foregoing remarks are applicable to repairs for an 8-in. as well as a 6-in. pump, except in so far as they relate to the air valves and the re-boring of both steam and air cylinders. In 8-in. pumps the air valves are placed in removable brass cases. The case containing the upper receiving and discharge valves, known as the valve chamber bush, should be ground in until there is a perfect joint on the two shoulders on which it rests. The upper valve chamber cap should be fitted so as to hold the bush firmly and must not be screwed down with sufficient force to distort the bush, for should this be done it would cause the valves and shoulders to leak and have a tendency to break off the top edge of the bush. The cap should make a joint on its outside bearing. To prevent the valve chamber bush from turning, a pointed set screw is employed. The point of this screw is countersunk into the bush. Care should be taken in locating and drilling the conical depression in the bush which the point of the set screw engages. It is also important to see that the point of the set screw is not forced against the bush. In order to prevent this the point of the set screw, when the screw is in its place, should just fill the depression.

The Lower Valve Chamber Cap.

The lower valve chamber cap contains the lower receiving and discharge valves. Screwed into the main casting of the air cylinder and immediately above the discharge valve is what is termed the discharge valve stop, the function of this stop being to regular the lift of the discharge valve. The set screw which is provided for preventing this stop from working loose should be firmly set up. When the valve chamber bush or lower valve chamber cap is re-used, the valve seats should be true up and the proper clearance allowed above the seat and around the valve top.

Air Valves.

The lift of the receiving valves should be 5-32 in., and for the discharge valves $\frac{1}{8}$ in. The lift of these valves should be maintained within certain limits. Valves should not be allowed to run when their lift becomes excessive, nor should they be given any less lift than that specified above. Too little lift results in reduced capacity for work and heating of pump. Too great lift not only causes the pump to pound and the valves and seats to wear rapidly, but also causes the valves to break. Too small a bearing surface between the valves and the seat causes rapid wear, and too great a bearing increases the tendency of

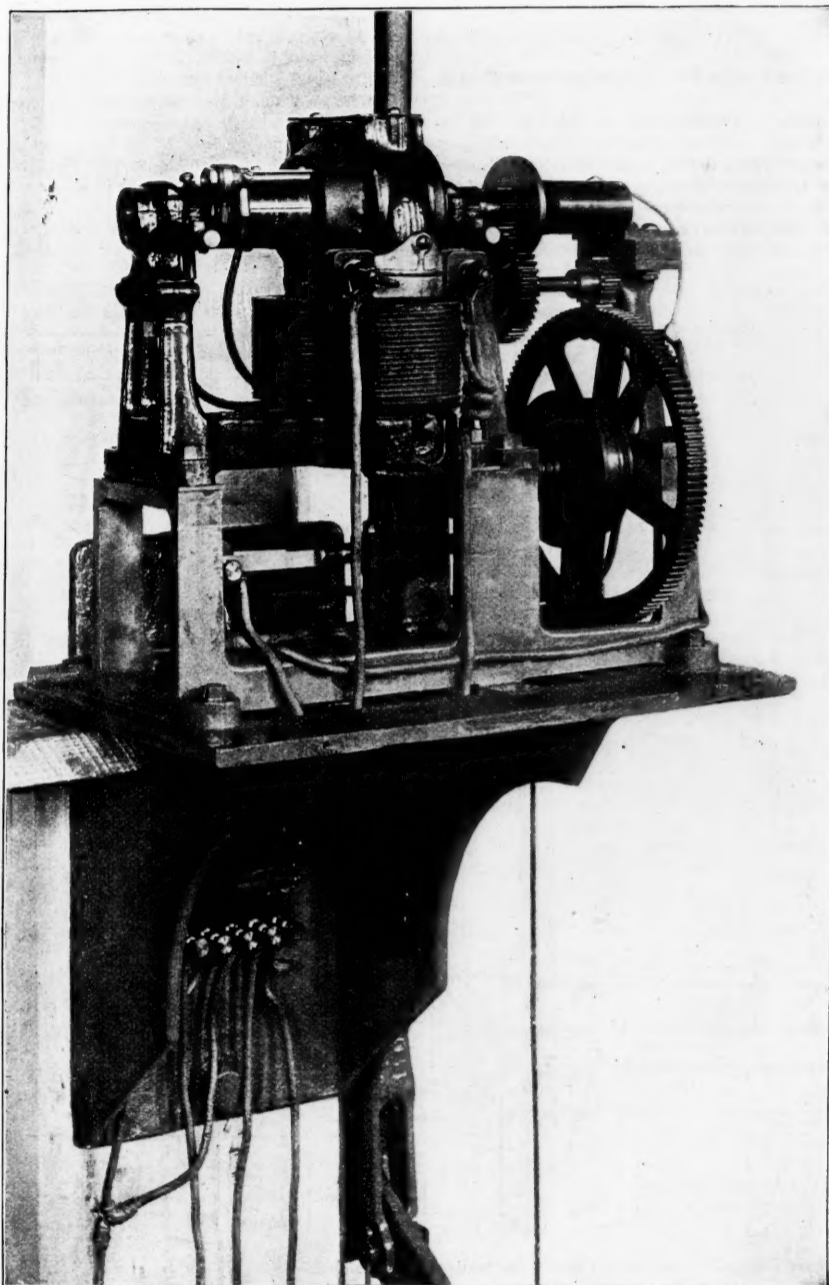


Fig. 2—Electric Motor for Semaphore Signal.

piston to prevent it from breaking. This is unnecessary, as the cause of breakage is from loss of compression on the upward stroke of the piston, and by the main valve striking stop before the piston bottoms on its cylinder on the downward stroke. The reversing piston and the stem should be a good fit in the cylinder.

Reversing Piston Packing Rings.

Packing rings of the reversing piston should fit closely, but not so close as to prevent a free movement. Poorly fitted packing rings in the reversing piston will result in the loss of the necessary compression on the upward stroke, and the consequent striking will ultimately result in a broken stem on the piston and loose nuts or heads on the main valve. Such rings cause the pump to blow on the downward stroke.

Reversing Valve Bush.

The reversing valve bush should be fitted to the chamber in such a manner that considerable pressure will be required to force it to its place. Great care should be taken that the bush have a uniform bearing along its entire length and also at the ends. There is but a small bearing surface between the supply port and the lower circumferential groove, and a failure to have a proper fit at this point will result in a blow that will be difficult to locate. It should be seen that the ports in the bushing and the ports in the head coincide.

Reversing Valve.

The reversing valve must be fitted to the bushing so as to have a steam-tight bearing on the face, but it must not bind in the bushing. The back of the valve should be made so as to slip over the reversing valve stem easily. There should, however, be no lost motion between the valve and the shoulders on the reversing valve stem. When a new reversing valve is being fitted to its bushing care should be taken that the corner of the valve does not obstruct the supply port to the bushing.

Reversing Valve Chamber Cap.

The reversing valve chamber cap should be fitted so as

where it travels in the reversing valve chamber cap, a new stem should be substituted.

Reversing Valve Plate.

The reversing valve plate should be renewed if at all worn, as any wear of the plate will cause an unequal travel of the main piston. It is not advisable to case-harden the plate.

Main Valve.

The main valve must be put in good order; that is to say, heads must be firmly fastened to the stem and nuts securely pinned on the stem. The packing ring grooves in the main valve pistons should be the same width their entire depth, and the rings should fit these grooves neatly. Rings should also be fitted to the bushings as closely as is consistent with freedom of action. Poorly fitted or loose packing rings will cause the pump to blow on both strokes. It is of the utmost importance that the standard distance between the face of the pistons and the ends of the main valve stem be maintained.

Main Valve Bushings.

It is advisable that if the main valve bushings are worn with the shoulders, or are larger than the standard, they should be removed and bushings of standard size fitted to the chamber in such a manner that they will remain stationary and steam tight. The lower end of the upper main valve bushing could be beveled to good advantage, thus facilitating the removal of the main valve should the stop break and allow the main valve to drop. The top bushing should be cut off so as not to project into the main steam cylinder.

Main Valve Stop.

The main valve stop should never be made adjustable. The practice of putting a set screw from the outside of the pump is one that is sure to lead to trouble on account of the ease with which the adjustment can be altered or the set screw work loose. The stop should be put in from the inside and riveted fast. Stops are now cast in the centre piece. Its length, and the thickness of the lower nut of

the valves to stick. Light, well-proportioned valves should be used.

Re-boring Air and Steam Cylinders.

On account of the thinness of the metal at certain points in these cylinders, it is not deemed advisable to re-bore them more than once. Your committee would suggest that when such cylinders are to be re-bored they should be increased to a uniform diameter of 7.9-16 in. for the air cylinder, and 8.1-16 in. for the steam cylinder. If taking this cut on the cylinder does not true it up, it should be discarded and a new standard size cylinder substituted.

Gaskets.

Gaskets should be made of 1-32-in. copper. This thickness will not alter the motion of the pump. The upper head gasket if broken between any of its openings, should be renewed. In replacing the gasket on the top head, see that the supply port is not obstructed. All gaskets should be annealed before being replaced.

Working to Standards.

It is highly essential that the standard dimensions be strictly adhered to, and it is questionable whether it would not be better to consign cylinders and bushings that need re-boring to the scrap pile rather than bore them out and be forced to have cylinders, bushings, pistons, piston packing, rings, etc., of different dimensions for the same class of pump. This multiplicity of sizes is confusing at times, to say the least, and unless a record of the dimensions of every odd-sized piece that is used in repairing a pump is kept, and unless the record designates upon what engine each particular pump is placed, it would not be a long

very limited extent. When a pump requires more than ordinary repairs, it should be taken off and sent to the repair room.

The 9½-in. Improved Pump.

In regard to repairs to Westinghouse's 9½-in. improved air pump, there can be but little said as yet. Your committee would call attention to:

1. The simplicity of the steam end of this pump, which makes it a very convenient one to repair. In case a pump should give out from a fracture of any part of the valve motion in the steam end, a new head can readily be put on.

2. The convenient arrangement of the air valves, and the fact that all air valves are of the same size.

Your committee not having had experience with air pumps other than those manufactured by the Westinghouse Air Brake Co., have confined their remarks to this make of pumps.

Renewal of the Filbert Street Pennsylvania Bridge

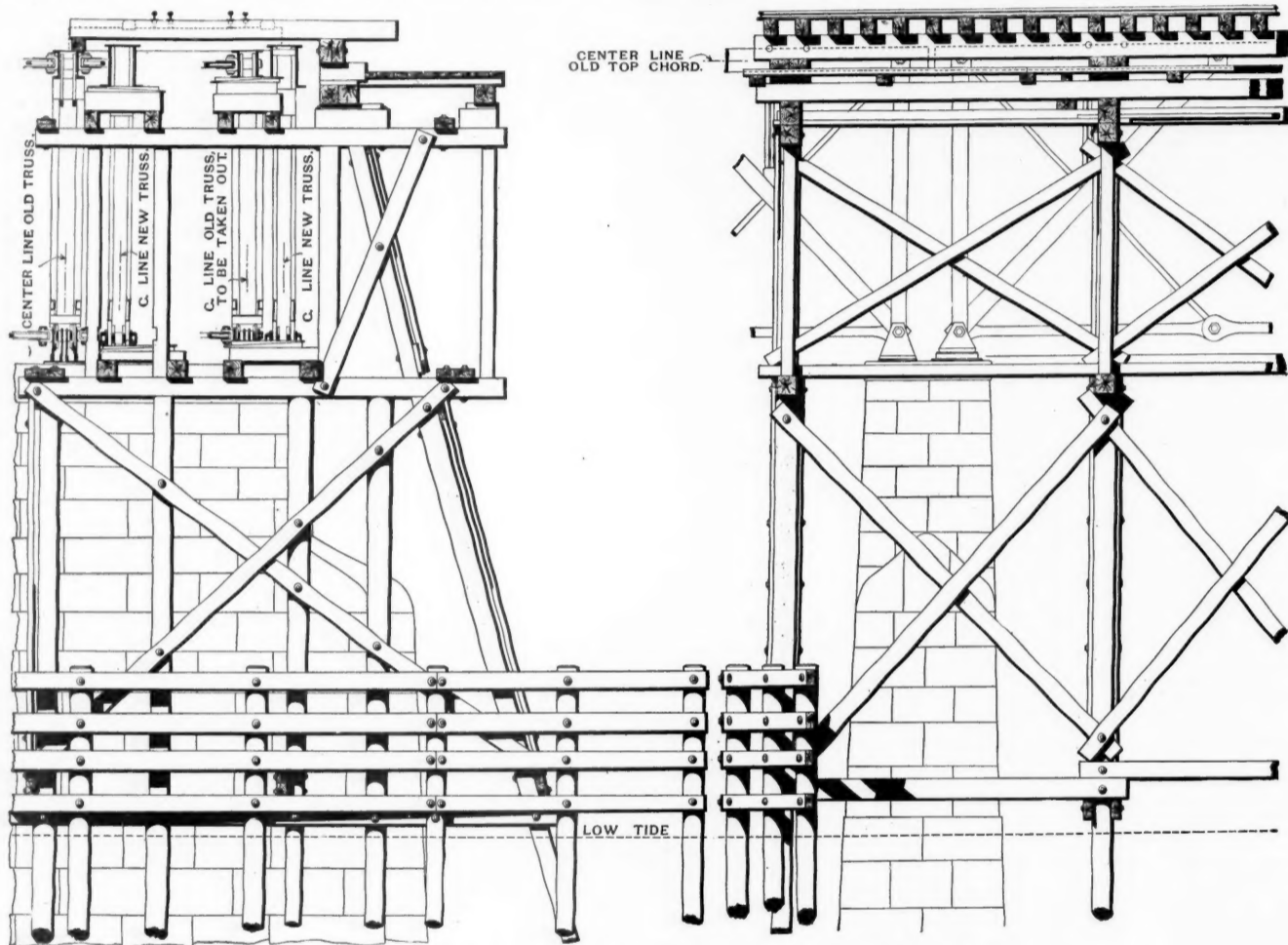
Quite recently the Pennsylvania Railroad Co. has renewed its bridge over the Schuylkill River at Filbert street, in Philadelphia, and we show herewith an illustration of the temporary structure and give below a brief account of the way in which the work was done.

All of the passenger and express traffic to and from the station in Philadelphia passes over this bridge, but not

resting on a truss of the bridge, which was to be removed some later day. These floor beams had a clear span of 13 ft., were spaced 21 in. centres, and carried the total weight of the track and its load. The beams and rails were now raised 8 in. to allow the old truss to be removed and give space to erect the new truss.

After the old iron work was removed, the iron for the new top chord was distributed in place. The top chord was then put together in about the middle of the space, that is, about midway between the final longitudinal position of the two new trusses and about 4 ft. lower than its final elevation. This was to give space for top riveting under the floor of the bridge. When the chord was riveted together, it was jacked up to its proper height, when the posts, braces and bottom chord were put in place. When complete it was jacked over in its permanent position. Each truss was handled the same way.

The sway bracing was then added, the wedges were knocked from under the panel joints and the bridge swung clear. The temporary floor beams were next removed to make place for the permanent ones, the track was lowered and the span was completed. All the spans were erected in the same manner. The material was unloaded from the shore on a flatboat, provided with a derrick, and hoisted to the first staging, after which it was handled by the



Renewal of the Filbert Street Bridge of the Pennsylvania Railroad at Philadelphia.

time before the air pump repairer would be unable to keep a stock on hand with which to make repairs with promptness. Under these conditions it would be necessary for him to take the pump to pieces before he could decide with any degree of accuracy the size of the different parts necessary to put the pump in proper order. Pump repair men should be provided with standard templates, and should use them. For such parts as are made in railroad company's shops, a set of hardened steel gauges should be gotten up. As a rule, it would be far better to order the different parts for repairs direct from the manufacturer. The overhauling of air pumps can be done to much better satisfaction where it is carried on under the direction of one man. "Many men of many minds" will apply to this branch of work.

Numbering of Pumps.

Each pump should be numbered irrespective of the engine on which it is placed.

Record of Work Done.

A record should be kept of the work done on each pump; also the date on which the pump was repaired.

Round House Inspection.

Round house inspection of air pumps should be made before each trip, the following points receiving special attention:

1. The suction of the air piston in order to determine the condition of air, the piston packing and the air valves.

2. Piston rod packing: Piston rods should be kept properly packed; this is quite important. Some members of your committee have had considerable experience with metallic packing and recommend its use.

3. Exhausts from steam ends: To ascertain condition of the stem end of the pump.

4. Pump governor: To see that it does not allow the pump to raise the air pressure above the prescribed limit; also that the pump gets the requisite amount of steam.

If a pump is reported as not working properly, or it does not work to the satisfaction of the inspector, an examination should be made, and if the trouble cannot be located and rectified, the pump should be removed.

Round house repairs should only be indulged in to a

withstanding this fact no trains were delayed by the work. The time occupied from the beginning to the completion of the work was about six months, but some delay was occasioned by the failure of the bridge company to furnish the iron. Only one span was renewed at a time, it being necessary to keep the river channel open to navigation.

The bridge consists of three spans, one of 41 ft. 6 in., centre to centre of end pins, and the other two, each 156 ft. 8 in. There are 10 panels in each span. The old bridge had four trusses in each span and was a deck structure. The new bridge is of the Pratt type, with the same number of panels and the same length of truss. Where three tracks were formerly carried by four trusses, there are now six. The base of the rail is about 42 ft. above high water in the Schuylkill, and the top of the piers 24 ft.

For the temporary work, piles were driven under the truss to be renewed, five abreast, and these were capped just above high tide, the bents being placed 14 ft. centre to centre. The use of longer piles would have been more economical, but on account of the small head room it was not possible to drive long piles except when they stood outside of the bridge line. On the caps of these bents, posts were framed, and capped just under the lower chord of the bridge; a floor was placed on the last, which reached to the under side of the lower chord, shown in the engraving.

The batter post of each bent extended from the river bottom clear outside of the bridge, reaching the topmost cap which was under top chord of bridge. A heavy stringer rested immediately over the batter post and ran the whole length of the span. After this was in place, temporary floor beams were put under the track, their outside ends resting on the stringers, and the inner ends

men. The longest period for which a track was surrendered to the carpenters was for three hours, when it was raised the 8 in. to relieve the old truss and to gain head room for riveting.

Records of Automatic Block Signals.

An interesting feature of the bridge renewal described on this page was the fact that the tracks supported by this bridge, and which were never weakened or disturbed so as to interfere in the least with the passage of trains at high speed except for two or three hours in the night, when there were few or no regular trains, were connected up as electrical conductors for the operation of automatic block signals. The successful operation of these signals throughout the time that the repairs were in progress was highly creditable to all concerned. We give below a statement showing the operation of all the signals on the Broad Street line for the three months ending March 31 last, as copied from the records of the road.

Number of home signals, 7; distant signals, 7; total, 14. Unnecessary danger signals were displayed from the following causes: Armature out of adjustment, 1; bolt dropping from engine and wedging in between battery and ground rail of involved tracks (this occurred once, but affected two signals), 2; main air pipe bursting (occurred once, but affected two signals), 2; exhausted storage battery (occurred once, but affected four signals), 4; relay out of adjustment, 1; four-pole battery switch jarred loose by repair man striking wall with hammer (this occurred once, but affected four signals), 4; battery rail grounded by battery wire, having insulation scraped off and touching girder (occurred once, but affected two

signals), 2; battery rail grounded by track men driving spike through to iron girder, 1; moisture in pin valve freezing, so that when magnet was charged the armature could not push valve down, 1.

Unnecessary caution signals were displayed from following causes: Leak in magnets of relay (occurred once, but affected two signals), 2; battery rail grounded by track men driving a new spike on top of a broken spike, driving the latter through to the girder (this occurred once, but affected two signals), 2; blade on home signal being out of adjustment (the circuit closer was out of adjustment), 1.

The estimated total movement of signals in three months was: Home signals, 135,000; distant signals, 80,000.

The percentage of failures to the total movement was: Home signals, .00014; distant signals, .000063.

There were no failures to safety, and during the month of March but one failure of any kind was discovered.

Sargent's Electrical Attachment for Steam Engine Indicators.

Until the advent of the compound locomotive it was seldom thought necessary to take indicator diagrams from both cylinders in making a locomotive test. It was fairly assumed that if the valves on each side were set alike, and other parts which affect the steam distribution were as nearly alike as possible to make them, the same steam distribution would be obtained in each cylinder, and diagrams were taken from only one cylinder. Even when diagrams were taken from both cylinders it was not necessary that they be taken from both cylinders at the same time. In testing compound locomotives, however, diagrams must be taken from both cylinders at the same instant. Those who had experience in the matter know how hard this has been to accomplish. In testing two-cylinder compound locomotives an extra man is sometimes stationed on the pilot to signal to the two men operating the indicators, and sometimes a rope or bell signal is used. By such means, however, it is impossible



Fig. 1.

to insure getting the two diagrams at the same instant. Thus, the necessity for an electrical attachment so arranged that when the pencil of one instrument is pushed against its drum, the pencil of one or more other indicators would be similarly operated and at the same instant has been apparent for some time, not only in locomotive engineering, but in stationary and marine practice as well. The engravings given with this show an electrical attachment by means of which diagrams may be taken with any number of indicators at the same time by one operator. The device was patented by Mr. Frederick Sargent, of

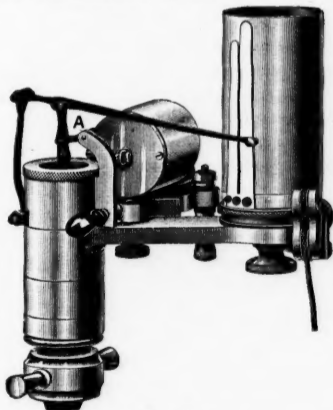


Fig. 2.

Chicago, and is manufactured and sold by the Crosby Steam Gage and Valve Co.

The attachment is in two parts. The indicator that is operated by the attendant has secured to it the part shown at A, Fig. 2. This part is merely what may be termed a push button switch, and is so placed that when the pencil of the indicator is pushed against the paper, the support for the pencil engages with the push button, and an electric current passes through the electro magnet shown at A in Fig. 1. The armature of the electro magnet in its normal position is held away from the magnet by a light spring. A light link connects the armature and the pencil frame, so that when the armature is drawn to the magnet the pencil of the indicator is drawn against the paper on the drum. The device can be readily applied to any indicator, and its use has demonstrated that it is entirely practical.

The indicator is being used more and more each year in locomotive work, and the paper recently read by Mr. C. H. Quereau before the Western Railway Club (see *Railroad Gazette*, March 9, 1894), will make the use of the instrument more general. The next improvement in indicators should be such as to make it possible to obtain a continuous indicator card.

The Restoration of the Purdue Laboratory.

Three months ago we reported the unfortunate destruction of the Engineering Laboratory of Purdue University, and it is very gratifying to be able to say now that at the opening of the next school year the facilities for laboratory work will be better and more extensive than ever before. The time has scarcely been sufficient to arrange financial matters, clear away the debris, prepare the plans, let the contracts and actually begin construction, but very definite assurances are given. The united efforts of the President and Board of Trustees have secured such a sum of money as will completely restore all that was lost and permit many additions. The enterprise of the Purdue faculty in establishing the plant and methods for locomotive tests has been widely appreciated, and will be imitated in other colleges, and the following announcement will be received with satisfaction by mechanical officers of the railroads.

Repairs have already been made to the foundry and woodworking shop, and all the machines and tools have been replaced. A new and larger cupola furnace has been added.

The machine room, forge room and steam engineering laboratory, which was entirely destroyed, is now in process of reconstruction, and will be completed by June 15. The machine shop equipment has already been fully replaced by new and improved machine tools, which are now in use by students in temporary quarters. The forge room appliances are all in the process of reconstruction, and the whole outfit will be put in place as soon as the building is ready to receive it.

The engineering laboratory contained a large variety of machines some of which were very heavy, which were more or less damaged. The triple-expansion engine, the Westinghouse engine, the boilers and some of the heavier hydraulic apparatus are being reconstructed upon the ground. The locomotive "Schenectady" will go through the shops of the Pennsylvania Company at Indianapolis. The smaller steam engines, the gas engines, the pumps, the testing machines and other light apparatus will be made as good as new, or be supplied by new ones. It can safely be said that these arrangements will result in an equipment for the engineering laboratory which in all respects will be equal, and in some particulars superior, to that which it contained before the fire.

The trustees announce that every machine, tool and piece of apparatus formerly in the laboratories, and necessary to carry on the instruction and practice provided for in the college catalogue, will be in place and ready for use before Sept. 14, 1894.

They also announce the following improvements and additions which will be available for the next school year:

The locomotive plant will be installed in a new building especially designed to receive it. The plant will be larger and much more complete, and the stall will receive any locomotive whatsoever, and it will be available for testing the performance of locomotives from any part of the country; the building will be connected with the Lake Erie & Western Railroad. A new traction dynamometer, made up of the weighing portion of an Emery testing machine of 30,000 lbs. capacity, is now under process of construction by Messrs. Wm. Sellers & Co. The possession of this will insure great accuracy in the determination of drawbar stresses.

The steam engineering equipment will be increased by the addition of the two engines of a Vaucain compound locomotive, mounted as a stationary engine upon a foundation, and to be run with steam, under the load of a friction brake. The exhaust will be piped to a surface condenser which will serve to give the steam consumption of the engines. This important piece of apparatus is supplied through the generosity of the Baldwin Locomotive Works. There will also be added, for steam engineering, several typical experimental engines of from 10 to 35 horse-power, each connected with a condenser for determining steam consumption. The list will include a Straight Line engine, a Buckeye engine and a Laval steam turbine; also a Kimble combined engine and boiler.

For testing strength of materials the magnificent 300,000-lb. upright Richle testing machine exhibited at the World's Fair has been purchased. At that time it was the largest upright machine in the world. It will accommodate specimens up to 10 feet in length, either for tension or compression.

An addition will be made to the building which will be known as the gas room. This will contain two experimental gas engines, a car-lighting equipment of the Frost dry carburetor system and a car-lighting equipment of the Pintsch system. All the experimental work upon gas will be conducted in this room.

The trustees gratefully acknowledge the hearty co-operation of manufacturers. All have been more than liberal in their discounts, and many have made repairs, or have exchanged old for new without cost to the University. A considerable amount of the apparatus mentioned has been loaned to the University for its use until such time as the University shall be able to pay for it.

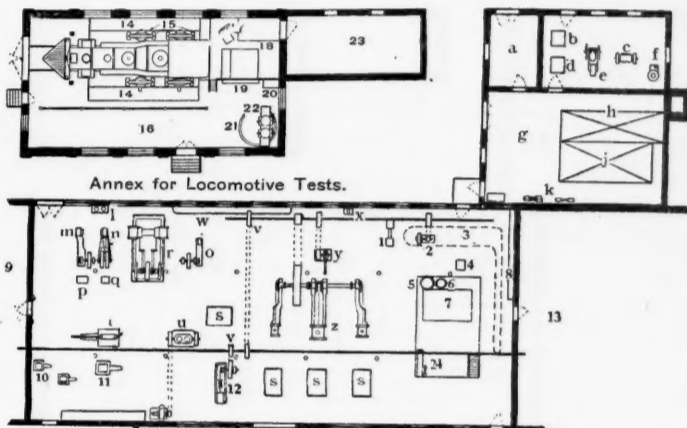
The accompanying engravings show plans of the new buildings, and the following scheme refers to the location of the machines and tools, by the letters and figures prefixed.

ENGINEERING LABORATORY.

a Coal Supply.	1 Fire Pump.
b Frost Car Lighting Plant.	2 Centrifugal Pump.
c Raymond Gas Engine.	3 Low Level Track.
d Pintsch Car Lighting Plant	4 Pelton Motor.
e Otto Gas Engine.	5 Leffel Water Turbines.
f Kimball Engine.	6 Stand Pipe.
g Boiler Room.	7 Water Tank.
h Babcock & Wiles Boiler.	8 Hydraulic Apparatus.
i Atlas Boiler.	9 Wood Room.
k Pumps.	10 40,000-lb. Testing Machine.
l Air Pumps.	11 104,000-lb. " "
m Buckeye Engine.	12 10 x 16 Atlas Engine.
n Straight Line Engine.	13 Machine Room.
o 7 x 10 Atlas Engine.	14 Pit.
p Laval Turbines.	15 Brake.
q Pyle Engine.	16 Visitors' Floor.
r Baldwin Compound Engine	17 Coal Scales.
s Table.	18 Tender Floor.
t 300,000-lb Testing Machine.	19 Appar. for Control of Brakes
u Westinghouse Engine.	20 Dynamometer.
v Clutch.	21 Tank.
w Gauge Testing.	22 Wriggins Tanks.
x Well Pump.	23 Coal Supply.
y Brake.	
z Harris-Corliss Triple Expansion Engine.	

Marjoribanks's Car Ventilator.

Readers of technical papers are familiar with the fact that sometimes the same device gets noticed twice in the same paper. Smith & Jones change the color of the paint on their planing or slotting machine, and tell the editor that a new and different machine has been "brought out," and so the cut which appeared a few months ago appears again. Brown & Robinson adapt their pump to pumping mud as well as black oil, and so a "new invention" in pumps appears. We have allowed Colonel Marjoribanks



Engineering Laboratories, Purdue University.

to "work the press" in this way. The season has arrived when passengers frequently become vexed at car windows that stick so they cannot be opened, and as there is evidence that this immoral influence still exists on some roads which ought to know better, we present illustrations of the Colonel's very effective device, in its improved form, as follows:

Fig. 1.

It will be observed that the proportions of the bar, Fig. 1, are much more symmetrical than in the old form, resulting, moreover, in a considerable saving of metal. The block, Fig. 2, is also better adapted to fulfil its functions, and the necessity of using two blocks occurs less frequently.

Fig. 2.

The method of operating this "invention" is practically the same as that prescribed for the old pattern, and we quote from our former description:

The block, Fig. 2, is placed on the window sill, either edgewise, endwise or sideways, as may be necessary to bring the upper surface in the right position to form a fulcrum for the lever, Fig. 1. One end of the lever is then placed in position under the lifting bracket in the sash, and, the fulcrum block being properly adjusted, the brakeman, calling a passenger to aid him, presses downward on the long arm of the lever with all the force he can command, and the window, nine times out of ten, will yield. Two blocks are sometimes necessary, and two should be provided, the extra cost being moderate. If there is no thumb piece on the sash, and no indentation large enough to admit the end of the bar, a stout screw may be driven into the sash.

Valuation of Elevated Railroads.

Upon petition of the Chicago & South Side Rapid Transit Railroad Co., an injunction has been issued restraining the County Treasurer of Cook County, Ill., from collecting the taxes assessed against the company's property. The total valuation as fixed by the Board of Equalization amounts to \$1,987,508, which the company claims is excessive. The State Board of Equalization for 1893 fixed the valuation at \$150,000 a mile. This would make the total assessment \$1,303,500, or deducting the assessment of \$180,000 on rolling stock would make the amount \$1,123,500. The committee, however, in making its report to the Board, recommended that the main track should be assessed at \$200,000 a mile, the side tracks at \$25,000 a mile, the buildings at \$21,200, and the rolling stock at \$180,000, a total of \$1,987,508. This report was adopted. The total of taxes so assessed reaches \$135,845.51. The company says that the net revenue for the period between June 6, 1892, and May 1, 1893, was \$84,259, and between November, 1893, and March, 1894, \$341,521. The company has already paid to the collector the taxes upon its rolling stock and personal property, and declares its willingness to pay "track" taxes according to proper valuation.



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The office of the Railroad Gazette is now at 32 PARK PLACE, New York.

It has been reported recently that the Pennsylvania Railroad and the Pennsylvania Company are changing their gage from 4 ft. 9 in. to 4 ft. 8½ in. The fact is that the standard gage on the Pennsylvania Railroad for passenger tracks is 4 ft. 8½ in., but for freight tracks it is 4 ft. 9 in. It is the purpose to make the gage uniformly 4 ft. 8½ in. when the wheel gage is definitely and accurately settled. The Pennsylvania Railroad has for some time had a committee from the Maintenance of Way Department, acting jointly with the Master Car Builders' Association, endeavoring to get a standard gage for all wheels which shall be more closely adhered to. There is now such a wide range in the wheel gage that it seems undesirable to abandon the 4 ft. 9 in. gage for the freight tracks. On the Lines West of Pittsburgh some of the divisions having light curvature are being relaid to 4 ft. 8½ in. gage whenever new steel is put down, it being the intention to make that gage standard. Where the curvature is heavy the 4 ft. 9 in. gage is retained.

About a year ago, or to be precise, April 28, 1893, we published a very full account of the use of 60 ft. rails on the Norfolk & Western Railroad. The additional experience of a year is said to have confirmed the opinions held at that time, and the Norfolk & Western is still buying rails of this length; in fact the company has recently placed an order for rails cut in 60 ft. lengths, with square ends, paying a premium of two dollars a ton over what would have been paid for rails of the same length (85 lbs. per yard), cut in 30 ft. lengths. This additional cost is balanced by the saving of one-half the number of joints. The reports of the last year show a considerable saving in the cost of maintenance with the long rail, and they show no increased trouble with expansion or creeping. On one section where the temperature has ranged from minus 15 to plus 110, no difficulty has been experienced. It will be remembered that a special joint is used on the Norfolk & Western with these long rails, and we are told that reports show that the cost of track labor on a 10-mile section laid with the long rails (85 lbs. to the yard) and the special joint is less than half of the cost on a similar piece of track with rails 30 ft. long and angle bar joints. On the Pennsylvania Lines West of Pittsburgh rails 33 ft. long are being used a good deal; in fact we are informed that 25 per cent. of the rails purchased for 1894 delivery are 33 ft. long. On the Pennsylvania Railroad proper, that is, the lines east of Pittsburgh, none of the 33 ft. rails are being used, though experiments have been made with 60 ft. rails for two or three years; but it has not yet been decided to adopt this length as standard. There appear to be no difficulties and in fact the long rails are in favor with the trackmen. In one instance, on a heavy grade, trains running in one direction, descending, there has been considerable trouble from creeping, but probably no more than was experienced with the 30 ft. rails. It is doubtless well-known that a committee appointed by the General Managers' Association of Chicago has for some time been studying this subject. The results of their investigation are not yet made public, but we believe that the committee will recommend that if any increase in length is made it shall be to 60 ft., and we

are much inclined to think that within a short time an important step will be taken in this direction; it seems such an obvious amelioration of the rail joint trouble.

We have chronicled from week to week some of the incidents of that aspect of Coxeyism which consists in forcibly seizing and running railroad trains. Was such a spectacle ever seen before in any country? Could such a spectacle be seen now in any other country calling itself civilized? It is not merely that the property of innocent and law abiding citizens has been taken and used by lawless mobs; it is not merely that these mobs have stolen what the railroad companies make to sell, viz., transportation; but these mobs have prevented any other use of the railroads for hundreds of miles and for many hours. Passenger trains have been delayed as much as 36 hours, and freight traffic has been stopped for even longer times. If a band of tramps should strip a town of horses and wagons there would be a tremendous row; but when they stop the railroad trains across a whole State, a perverted public opinion takes it as a colossal example of American humor; or those who are more seriously inclined look on it as an occult social problem that must work itself out. We do not propose to dig for the roots of Coxeyism, but suggest that the peculiar views that the public takes of the relations of the Coxeyites to the railroads are not new or strange. We have seen the same thing on a smaller scale for years all over the Union. Every week tramps seize, not trains, but cars, in New York and Massachusetts and Maine, as well as in Oregon and Kansas. Every month they pound brakemen if they do not defy the sheriff. These things are quite a matter of course, and it is quite a matter of course that the same thing should be done on a larger scale when the conditions are right. It will always be so until the owners of railroads and all other citizens of respectable standing realize that the laws are for the protection of railroad property as well as horse property. The railroads themselves are largely responsible for the warp in the public mind. They have weakly failed to demand protection from municipal and county officers until folks think they have no right to it.

The Metropolitan Railroads of New York and London.

What will happen next in the tedious course of getting more "rapid transit" railroads within the city limits of New York no man can foretell, but the weight of probability seems to incline toward an underground system of some sort, either deep or shallow; either aided by the city in some way, or built entirely at the risk of private capital. And that being so, it will not be uninteresting to make a few comparisons between the greatest elevated railroad system in the world, and the greatest underground system; that is, to compare in certain features the metropolitan railroads of New York and London. The conditions are taken as those existing at the end of 1892, for that is the last year for which the figures are available for the London roads.

The Metropolitan system of New York covers 36.14 miles, all with two or more tracks. The underground system of London covers the Metropolitan, 67 miles, of which 17 is single track, the Metropolitan District 19 miles, and the Metropolitan and Metropolitan District City Lines and Extensions 2 miles; in all 88 miles, of which 70 is double track or more. The New York system is extremely simple, consisting in the main of three parallel routes running the length of the island, four one-third of the way, and one spur of 3.74 miles (the old Suburban) running north of the Harlem. On this system nothing but strictly metropolitan business is done, as there is no direct communication with surface railroads coming in from the suburbs. On the contrary, the metropolitan system of London is extremely complicated. The two underground railroads emerge to the surface and reach out into the suburban district on the west and northwest of London, and many of the great lines entering London from various directions have running rights, and actually run the trains from their own tracks, unbroken, over the tracks of the underground road to stations in the heart of the city. The London & Northwestern, for instance, coming in from the northwest of London, and running over a bit of joint track owned by it and the Great Western, reaches the Metropolitan District tracks at Earl's Court Junction in Kensington, about 4½ miles west of the Mansion House, and runs over the District tracks 5¼ or 5½ miles to the Mansion House station. The Great Western runs its trains over the same route. Thus, these two lines carry their suburban passengers into the very heart of the city, commanding all the stations on the District line east of Kensington. The line over which these trains run is the southern side of what is known as the Inner Circle. The Great Western also runs its trains from Bishop's Road station

about a quarter of a mile northwest of its Paddington terminus, easterly over the Metropolitan line, that is, along the north side of the Inner Circle, to Aldgate station, which is also within the limits of what is known as the City, and which lies between the Liverpool Street station and the Fenchurch Street station of the Great Eastern. The distance traversed by these trains is about five miles.

The Great Northern, coming into London from the north with its terminus at King's Cross station, reaches the Metropolitan at King's Cross junction, close by that station, and runs southeasterly to Moorgate street, and to West Street junction, about two miles, thus reaching, with its suburban trains, the same populous district which is commanded by the railroads of which we have spoken above from the Mansion House and Aldgate Street stations. The Midland, which also comes in on the north side of London at St. Pancras station, close by King's Cross, reaches the Metropolitan at the same junction as the Great Northern, and runs its trains to West Street and Moorgate Street also. The London, Brighton & South Coast, coming in from the south and traversing the city proper, with a terminus at Holborn Viaduct, reaches West Street junction about one-quarter of a mile north of that terminus, and runs its trains to Moorgate Street and to King's Cross junction. The London & Southwestern, coming to London on the south side of the Thames, meets the Metropolitan District at Putney Bridge junction, just north of the Thames, and runs its trains to Kensington High Street, and to South Kensington, about three and a half miles, reaching in this way the West End district in London. The Metropolitan, whose tracks make the northern, northeastern and western sides of the Inner Circle, runs its trains over the south side of that loop by the Metropolitan District tracks, to the Mansion House, and runs out over the Great Western line from Bishop's Road to Westbourne Park, about a mile, and it also runs off northwesterly into the suburban district over its own tracks. The Metropolitan District runs out over the London & Southwestern to Richmond, four miles, and southward over the same line three and one-half miles to Wimbledon. It also runs out by its own tracks to the western suburban district at Ealing.

It may be that there are still other running powers, by means of which the various railroad companies concerned in city and suburban traffic use each other's lines; but the facts recited are enough to indicate the far greater complexity of the traffic over the underground railroads than over our own elevated railroads, and to suggest how well the London suburbs are served by these connections. They show also how the great railroads can take their trains into the heart of what is perhaps the most crowded city area in the world.

It may be imagined that such an interchange of trains involve a number of junctions, and pretty complicated time-tables, so that it is necessary for one who boards an underground train to know definitely where he wants to go, and to look sharp to see that he gets the train that will take him there. Yet all the trains running over these various lines make all the stops at the stations which they pass, and unless one is going beyond a junction, he may safely take the first train that comes along. Besides the passenger traffic, the underground railroads of London do also a certain freight business. The Metropolitan and the Metropolitan District are credited, in 1892, with about 1,700,000 tons of mineral traffic, which presumably is almost entirely coal. They also are credited with 640,000 tons of general merchandise traffic.

The total passenger journeys on the elevated railroads of New York, including the Suburban Rapid Transit, in 1892, were 213,692,570. In the same year, the London underground railroads carried 115,266,000 passengers, exclusive of holders of season or periodical tickets. The number of journeys made by this class of ticket holders it is impossible even to estimate closely. There were over 60,000 of these tickets, and allowing each ticket holder to have made two journeys a day for 250 days, we may add 30 million more passenger journeys, making, say, 145 million as against 214 million on the elevated railroads of New York.

The total paid-up capital of the underground system of London is £23,410,296, or \$114,008,141, say \$1,296,000 a mile. The stock and funded debt of the elevated railroads of New York, that is, of the Manhattan Company, and the stock and bonds of the Metropolitan (of New York) on which the Manhattan pays interest, amounts to \$70,896,000, or \$1,961,700 a mile. The earnings of the two systems in 1892 were £1,312,679, say \$73,000 a mile for the London system, and \$10,835,978, say \$300,000 a mile for the New York system. It is a well-known fact that the London underground railroads pay but slight returns to their stockholders, and that the New York elevated railroads are very profitable, and we often hear that the

great reason why the London roads are not better investments is the excessive cost of building them. The figures just given show the insufficiency of this reason; that is, the debt per mile of the London system is actually 35 per cent. less than that of the New York system, but the gross earnings per mile of the New York system are more than four times as much as those of the London system. The cost of working of the New York system was given in 1892 as 54.66 per cent., and the Manhattan Company paid \$1,900,000 in interest, and \$1,800,000 in dividends, being 6 per cent. on its stock, and various rates from 4 to 7 per cent. on the bonded debt of the system. In the same year the Metropolitan of London, paid 3¼ per cent. on its ordinary stock, 1½ on a small amount of guaranteed stock, 4 per cent. on preferential stock, and 3½ to 4½ on debenture stock. The average return paid on the debt of this system in that year was about 3½ per cent. The Metropolitan District paid nothing on its ordinary shares, and, indeed, has paid nothing on those shares for ten years. It paid from 4 to 4½ per cent. on the guaranteed stock, 3 on certain preferential stock, and from 4 to 6 on debenture stock, the average rate paid in that year on all its indebtedness having been about 3 per cent.

It is obvious that the profitability of the two systems is not a question of debt per mile (we will not say of cost, for that is something quite impossible to ascertain), nor is it necessarily a question of economy of working, but primarily it is a question of the gross earnings. That is, it depends upon the adjustment of the railroads to the wants of the public, and this is a many-sided question, involving the location of the lines in reference to the area and population to be served, the service of the public as regards fares, speed and frequency of trains, the invitation extended to the public to use the trains, in the way of attractiveness and accessibility, and the efficiency of the external competition. Some of these conditions we shall consider in another article.

The Interstate Commerce Law.

We are glad to see that Interstate Commerce Commissioner Knapp spoke plainly at the Washington Convention of Railroad Commissioners in favor of repealing the anti-pooling law. This and other questions now uppermost in the minds of those who wish to strengthen the good features of the Interstate Commerce law are so full of difficulties that it is quite unlikely that anything like a large majority can be secured in favor of a strong resolution in any of the directions in which the law needs to be improved, so that there is the more urgent need of what the stump speakers call "ringing words" from individuals who have firm convictions, and who can get a hearing. This great difficulty of securing a crystallization of opinion is manifest in the Convention of State Commissioners, in the Interstate Commission, in the Committees of Congress and in Congress itself, and unless some of the secondary questions can be eliminated from the discussion there is great danger that the minds of Congressmen will become so confused on this subject that they will take no action at all.

And yet there has been a very general clarification of views on two important sections of the law, that concerning pooling and that concerning imprisonment for violations, and these two questions can by a little exercise of the "process of exclusion" be made quite simple; so that if Congressmen's attention can be secured an intelligent vote ought to be within reach.

There is, we think, little hope of improvement in the present situation except by making pools legal. The mere repeal of the fifth section, leaving the roads to make pools under the common law, with the risk of having the courts declare the contracts made under them unenforceable, will afford little, if any relief. The larger roads are wiser now than they were in 1886, and it is barely possible that they could now form a pool which would not be killed by its own parents before it had lived long enough to do any good; but there are so many more railroads now to fight for a share of the business, and there is so much less traffic that is carried at profitable rates and that furnishes money to console a manager when he is screwing up his courage to remain in a losing pool, that it is very doubtful whether stable rates could be maintained without legally enforceable penalties for violations of agreements, any better than they could previous to 1887. Every one knows that pools were then only a partial remedy for rate cutting.

In arguing in favor of pooling it is highly important to keep constantly prominent the main point, that stability of rates is, under the conditions now existing all over the United States, and which are likely to continue to exist, more important than cheapness of rates. It may seem hopeless to try to do this with any success with men holding such views as those expressed

by Railroad Commissioner Mills, of Minnesota, at the Washington Convention last week, but this is the issue and nothing is gained by evading it. Every railroad man must admit that for the present, and for the short distance into the future that most people take into consideration, the aggregate amount paid by the public for its freight transportation may be less if cut-throat competition is continued. Unless a Congressman or a railroad commissioner can be convinced that the merchants, the grain buyers, the grain sellers and other shippers in his territory will be better off with steady rates than they are now, he cannot be convinced so that he will stay convinced over night, that pooling is necessary. To people who are more or less influenced by the belief that the railroads are the enemies of the farmers, it is important to show that the secret favoritism by which large shippers have secured advantages over their small competitors will not be stopped until pooling is made effective; and that railroad managers will never feel easy about their financial affairs, so as to put up new station buildings, reduce local passenger fares and make other improvements, until the income of the roads can be made more stable than it is at present. The Granger will, indeed, answer that he dare not trust a railroad manager with more money, for fear he will at once run off to New York with it; but we cannot see that the manager could make matters much worse than they are now, whatever he did. If a farmer or other shipper desires any improvement at all he would do well, we should think, to drop consideration of these future difficulties until they come in sight.

The men who hesitate most at approving pools are those who feel sure that the railroads will advance rates. Mr. Blanchard has told them, (in his argument before the committee at Washington, on March 2), that competitive conditions will still be very strong and that the most that can be expected is that pools will keep the present low rates from falling lower; but they do not believe him, though he spoke the exact truth. There are now so many railroads, and they have, in their reckless attempts to get business from each other, provided themselves with such enormous facilities, that any agreement to raise rates above a most moderate basis would fall to pieces of its own weight. The volume of traffic would at once fall off, some road's facilities would be idle, and that road would demand, and secure, a reduction of rates.

And in our process of exclusion for the purpose of simplifying this question, we may as well at once agree with these fearful ones that pools should be carefully watched by a Government Commission. Publicity is necessary, and every conservative railroad man recognizes the fact. But all the discussion thus far had concerning the methods of this governmental supervision has left us just as much in the dark as we were at the start, and there seems to be no hope of agreement upon anything except that pooling contracts should be filed with the Interstate Commerce Commission. And what more than this is it practicable to do? The Commissioners cannot, with any intelligence, approve a pool beforehand, for no man under heaven can tell how it will affect the income of the roads interested—which is the vital point—until it is tried. The present desideratum is to apportion traffic so that competitors will not fight for it, but the very essence of a pool is not to make this apportionment beforehand, but to provide a way of curing its inequalities afterward. If a pool does any harm it is by encouraging railroads to raise rates, but the Interstate Commerce Commission already has all necessary power to reduce rates. To order the abrogation of a pooling contract for the purpose of reducing a rate would be an indirect process and might be ineffective. If effective, it would be by introducing unregulated competition, which is certainly no better for anyone than a direct order to make a specific reduction, and it is likely to be much worse. In any event the power of the Commission would necessarily continue to be subject to the constitutional limitations which permit appeals to the courts, so that the legal delays that now make trouble would be no less vexatious. The fact that a proposal to empower the Commission to take summary action is now being urged, is one of the most potent causes of the present delay, for conservative men, in Congress or elsewhere, hesitate to entrust affairs of such magnitude to any tribunal that is liable, either now or in the future, to be biased by partisanship or weakened by unfit appointments.

The other change in the law, for which there is a pressing necessity, is to punish the principal—the railroad company—instead of the agent, for violations. Experience has shown that agents will not expose each other, (nor will any one else expose them, apparently), and the present penalty clause is a complete failure. But it is generally believed that individuals would give evidence against a law-breaking railroad company when the penalty was to be a fine, though they will

not testify against an individual who, may thereby get into prison. The desirability of this change is so evident that we will not waste words upon it. In a case like this, where people disagree as to the moral wrong of an act which is prohibited by law, an unenforceable law on the statute book does more harm than good.

There are other features of the law that ought to be changed, and all interested could probably agree without much trouble what the changes ought to be; but these are all of minor importance as compared with the two we have emphasized. Pooling is not a heinous crime and the chief present duty of all concerned in bettering the law is to see that the truth in this matter is more generally understood. It may not be amiss, in this connection, to remind railroad men that the feeling that the railroads are all the time forming pools in defiance of the law is still strong in many quarters, notably among editors who deem it their duty to "take the side of the people" in any railroad discussion. An agreement like that recently made by the Central Traffic Association roads at Chicago, looks, to a layman, so much like an actual pool that it is hard to convince him that it is not one. Railroad men who "give out interviews" will do well to make some clear statements explaining just what these agreements are.

The Rate Wars in the West.

Rate cutting west of Chicago has reached such magnitude that the two remaining associations, the Western Freight and Western Passenger, are entirely powerless to check the demoralization, and it appears that the presidents have had to be called together to agree upon action to check the spread of the evil.

The causes for the present unfortunate state of affairs are many and complex, but all have grown out of an unwillingness on the part of the traffic officials to concede a single inch for the sake of a restoration of normal conditions.

Beginning with the disturbance of trans-continental passenger traffic, the passenger situation has grown steadily worse. Charges and counter charges are freely made that this and that road is responsible for the situation, but the press reports seem to lay the greater share of the blame, whether rightfully or wrongfully, on the Union Pacific. Certainly, if, as reported, the only obstacle that stood in the way of a restoration of all passenger rates (which had been agreed to pending a conference now going on between the presidents of the Southern Pacific and the Atchison, the original combatants in the reduction) was the failure of the Union Pacific to co-operate with the passenger association in carrying out its immigrant agreement, that company must bear the burden of proof. It is significant that all the other lines unite in the declaration that they are ready to restore and maintain rates.

Following closely upon the heels of the passenger demoralization, comes the trouble over freight rates to what is termed Colorado common-point territory, followed by sweeping reductions in all trans-Mississippi River territory. This break is said to have been caused by the collapse of the Southwestern Missouri River agreement. It seems that one of the members felt obliged to make a special contract to "even up" things with some large shippers, and that the other members were advised of the situation so far as to get them to admit that this would have to be done, but subsequently one of the lines party to the agreement began meeting the reduced rates of the first line, thus defeating the purpose of the reductions, with the natural result that each line was soon knifing its neighbor, making the situation so bad that the Atchison determined to seek a solution by heroic treatment, and openly cut all the rates 50 per cent., and in some cases reduced them nearly three-fourths, following its action by withdrawing from all the associations.

In territory east of Chicago there is some hope that freight rates will be adjusted and maintained after the result of the arbitration announced for this week is concluded. It is encouraging to hear the Central Traffic lines have so far reconciled their differences that there is a difference of only 10 per cent. to be distributed by the arbitrator, and it is to be hoped that ex-Chairman Walker's award will be accepted and carried into effect in good faith.

It is unfortunate that the passenger interests in the same territory do not appear willing to resort to similar means for settling their existing differences.

Seizures of Trains by Coxeyites.

Seizures of engines and cars by large gangs of tramps have become so numerous during the past week that the news items are characterized by a good deal of sameness, and we can only refer to them in a brief way. The most flagrant defiance of the authorities since our last number went to press is that reported from the Missouri Pacific road in Kansas, and, as illustrating the methods pursued in all these outrages, we print in another column some of the particulars of this case. The Governor of Kansas seems to have pursued a very weak policy in this matter, and he went so far, we believe, as to express his sympathy with the law breakers. It is, perhaps, needless to add that in this he is no different from several other governors. Sanders' army was taken before the United States Court at Topeka for trial, but no definite action by the court is yet reported.

The Union Pacific, between Portland, Or., and Granger, Wy., was bothered with tramps in parties of all sizes for several days. They rode upon freight trains in gangs of 20, 50 and 100, about as they pleased, and, according to the reports, the company tolerated a good deal of this conduct in order to avoid a blockade of freight. Finally an engine and six cars were taken at Montpelier, Idaho, by a small band who at once started eastward. They were headed off at or near Green River, Wy. United States troops were brought to the scene, and succeeded in keeping the tramps at bay, but at last accounts they had not been brought into court.

Near Pittsburgh, Pa., 23 tramps boarded a Baltimore & Ohio freight train, but detectives were on the watch, and the whole crowd was arrested and imprisoned for 20 days. At Sprague, Wash., a tramp on a freight train succeeded in stopping it by opening a brake valve at a point where his company were waiting to get aboard, but policemen were at hand, and a fight ensued in which many shots were fired. There was also a fight at North Yakima, Wash., on May 9, in which several marshals were wounded.

An engine and four cars of the Rio Grande Western were stolen at Provo, Utah, on May 12, and the railroad company had to derail an engine in front of them. Troops of the regular army were called out to maintain order. A Missouri, Kansas & Texas freight train was seized by tramps near Houston, Tex., on May 12, but the crew finally drove them off. The Southern Pacific has had much trouble on the line through Nevada. A band of 300 striking miners swarmed upon a freight train of the Missouri Pacific near Lexington, Mo. A gang boarded a Big Four passenger train near Cincinnati on the night of May 9, and the police had to be called to eject them.

The Montana Coxeyites, who, under the leadership of William Hogan, stole a Northern Pacific train at Butte three weeks ago, and who were brought back to Helena, were tried in the United States Court, Judge Knowles presiding, on May 14. Hogan was sent to jail for six months, and the engineers and firemen and forty captains and lieutenants for two months each. Hogan's attorney wanted to give bond for appeal, but the court said there was no appeal where an order of the court had been violated.

Numerous merchants in Baltimore are complaining that the Baltimore & Ohio Railroad has seized cars of coal consigned to them, and used it for its locomotives. According to the press dispatches this action of the company is taken without consultation with the owners of the coal, and, therefore, amounts to grand larceny. Such statements would hardly be credible but for the fact that railroad companies have often done this thing before now, relying upon their ability to subsequently convince the owner that in depriving him of his rights they had been doing him a favor. The Baltimore papers give names and particulars showing that the consignees feel grossly outraged. In one case a consignee got warning that cars on his side track were to be hauled away, and he tore up some rails so as to delay the switching engine long enough to permit the coal to be dumped out. Reports of similar seizures come from Cleveland and various other places.

An officer of the Chicago, Milwaukee & St. Paul, in Iowa, writes us in a tone which seems to indicate that he feels hurt because we said recently that "there are no flies on the men who handle the trains" in the vicinity of Chicago. Our friend seems to infer that we meant to say that trainmen west of the Mississippi River were so far from Chicago that they were not very lively. We hasten to disavow any intention to convey such an idea. We are so far east of Chicago that it has become a habit of mind to lump together the whole territory between Elkhart and Omaha as "in the vicinity of Chicago," and we intended our remark as a compliment to the men who run trains in Iowa. We know that from a strictly geographical standpoint, this notion of distances is wrong. It is true that there are now so many large towns and cities in the West that one who does not circulate among them frequently comes to have a very inadequate idea of their magnitude and importance. On the other hand, however, the very greatness of the west compels one to consolidate a large territory in a single view in order to give it any attention at all. Life is too short to take in everything in this country, and we must beg our readers' indulgence if we sometimes say Chicago when we mean "out West" in general. Our correspondent gives a few instances of the fast time made by trains in Iowa. The through passenger trains of the Chicago, Burlington & Quincy, the Chicago & Northwestern, and the Chicago, Milwaukee & St. Paul make as good time, with as frequent stops, as that of the Limited on the Pittsburgh, Fort Wayne & Chicago. Freight loaded in Chicago at 4 o'clock in the afternoon, is regularly carried into Omaha at 10.30 the next night, and freight loaded in Chicago at 6 o'clock is delivered in Omaha at 7 o'clock the second morning. Live stock is carried from Omaha to Chicago, 500 miles, in 24 hours, and stock trains from Sioux City, 517 miles from Chicago, frequently reach the latter city in 19 hours, equal to 27.2 miles an hour. The Chicago, Milwaukee & St. Paul takes perishable freight from Kansas City to Minneapolis, 600 miles, in 32 hours, equal to 18 1/2 miles an hour. It is needless to say that we were well aware of these very fine records. The most obvious comment upon them is that it is much to be regretted that such great expense has to be incurred for such a small profit as is received on the traffic which these trains carry. It is true that, as our correspondent intimates,

many of the roads east of Chicago do not make such fast time, or if they do, they do it less frequently. But the difference is susceptible of a very rational explanation. The latter roads being older, their respective facilities are probably better known to shippers, and competition more frequently takes the shape of difference in price; while the roads west of the Mississippi River, with their lighter traffic and a volume of freight more fluctuating, have better opportunities and more frequent incentives to compete in speed and facilities. The pity is that they have to compete in both speed and cheapness, thus reducing the profits below a reasonable figure. If there were one or two more railroads between Chicago and Omaha we should expect to see hog trains running the whole distance at a mile a minute.

The future of the Coast and Geodetic Survey is in the balance, but its fate will probably be decided in the next few days. The parties who have undertaken the extermination of this honored institution have organized their crusade upon strong political lines. The propriety and justice of referring Mr. Enloe's bill to the Committee on Naval Affairs, is open to criticism for the reason that this Committee would naturally be biased in favor of the Department which it literally represents. The Committee on Commerce was the logical committee to decide the future of the Coast and Geodetic Survey Bureau. The battle before the committee is an array of science against partisanship. Mr. Woodward, Professor of Mechanic Arts, of Columbia College, and George H. Williams, of Johns-Hopkins University, have appeared before the Committee and have presented able arguments against the bill providing for the transfer. Mr. R. C. Glascock, a discharged employee of the Bureau, appeared in behalf of the bill. Many of the educational institutions of the country have sent memorials to Congress, but Secretary Carlisle has written another earnest appeal for the transfer. The strongest argument for making the transfer is that the Navy Department at this time does and has been doing the greater portion of the hydrographic work of the survey; but investigation does not prove this assumption. For 14 years, from 1860 to 1874, the work was done entirely by civilians. There are now connected with the department, men who have spent more than twenty consecutive years in the service, and to their efforts and experience are largely due the accuracy and completeness of the work. The Navy Department has an abundance of work for its few available officers. Professor Mendenhall, the Superintendent of the Coast Survey, has given practical proof of his fidelity and interest in the work of his bureau, by refusing a lucrative and most congenial position as President of the Ohio State University, recently offered him.

The coal strike remains unsettled, and the convention of miners at Cleveland, which has been in session two days, as we go to press, has not yet agreed upon anything. Railroads here and there are finding it necessary to economize in using coal, and numerous small factories have shut down for lack of fuel, but some mines in West Virginia, Maryland and Pennsylvania are still at work, and there is talk of importing coal from Wales and from Nova Scotia, so that it does not seem likely that the strikers can hold together a great while, or that the coal famine can become very serious. Meanwhile the suspension of coal traffic has produced marked dullness on many roads. The Pennsylvania Railroad has taken off all trains on four short branches in the vicinity of Greensburg, aggregating 30 miles, and the passenger and merchandise traffic will have to look out for itself. On the Pittsburgh, Lake Erie and the Pittsburgh & Western it is reported that nearly all of the freight crews have been laid off. The Pennsylvania has gone so far as to reduce the working time in the Altoona shops to thirty-six hours a week. The Chicago, Burlington & Quincy, if we may believe the Chicago papers, has prepared one or more locomotives to burn oil. The discontinuance of freight trains on account of the suspension of work at the mines is reported on several different roads in Illinois and Iowa. The Philadelphia & Reading was just preparing to burn soft coal on a number of its engines which have heretofore burned anthracite, but the change had to be postponed. It is reported that the Rome, Watertown & Ogdensburg is preparing to burn wood in some of its locomotives. Chicago coal dealers have been negotiating for coal at West Superior, Wis., where there is a large surplus on hand. The anthracite mines in Pennsylvania have begun to feel an increased demand on account of the scarcity of bituminous coal.

In the new "Contribution Box" of the *Journal* of the Association of Engineering Societies, we discover that Prof. Hiero B. Herr, the President of the Western Society of Engineers, urges the formation of a new national engineering society, to have its headquarters in Chicago, and to have a name signifying its national character, as for instance, the American Society of Engineers, or the Engineering Institution of the United States, or the United States Institute of Engineering. We began to ask what is the matter with the Western Society, which now exists, which has long had its headquarters in Chicago, and on the throttle valve of which President Herr's hand rests? We discover, however, that the term "Western, as applied to a society with headquarters in Chicago, is a misnomer, and that Chicago, by virtue of its central position, and of having demonstrated the justness of its claim to be considered the metropolis of America, is the city where this great national society should have its home." Very well then, why not change the name of the existing Western

Society? Then you have all the elements of the great National Society already existing; you have the significant name; you have the headquarters in Chicago; you have the enthusiastic President; you have, in fact, the whole machinery with its wheels already in motion. But really, is it not just a little "provincial" to keep on asserting that Chicago is the metropolis of the country, and that the truly national institution cannot have its seat anywhere else? Cannot the really great man let himself be taken for granted?

Judge Taft, of the United States Court which appointed the Receiver who is now in charge of the Louisville Southern Railroad, has ordered the Receiver to make an annual report to the Interstate Commerce Commission, in accordance with the requirements of that body. This road, lying wholly within the State of Kentucky, has hitherto refused to make reports to the Commission, claiming that it was not engaged in Interstate business, but the Commission took advantage of the fact that the road came into the hands of the court, and applied for the present order. Judge Taft found that the road was a party to through billing arrangements with other roads to and from points outside of its own State, and, of course, held that it was engaged in Interstate commerce. It has been long held by the courts that a shipment which is destined to cross a State line is Interstate commerce from the moment it starts, so that a road like the Louisville Southern would be engaged in Interstate commerce even in the absence of through billing arrangements. The judge does not make a specific declaration upon this point, though his language seems to imply that he regards this point, like the other, as perfectly sound.

Sweet are the uses of adversity
Which like the load, ugly and venomous,
Wears yet a precious jewel in his head.

But if the "divine Villiams" had anticipated the elevated railroads in New York, he would have said something about the aesthetic uses of adversity. The man of taste who journeys up and down the island must have felt within the last few weeks, or perhaps months, that something had happened to make the interiors of the elevated cars much pleasanter and more sightly places than they used to be. If, besides being a man of taste, he depends for some part of his living upon what other folks pay him for advertising their wares, he will have discovered what it is that has made those cars more pleasing to the aesthetic eye, but perhaps more sombre to the utilitarian who owns elevated railroad stock. He will have seen that probably two-thirds of the advertising signs which have long cumbered those cars have disappeared, to the great improvement of their appearance. This is a striking illustration of the shrinkage in business and of the economies that folks are making on all hands.

NEW PUBLICATIONS.

The Uses of Compressed Air. By Addison C. Rand, 94 illustrations and alphabetical index, pages 138; New York: The Republic Press, 14 Lafayette Place; price \$1.00.

Mr. Rand, who, by the way, is President of the Rand Drill Co., and who knows a great deal more about compressed air than he has told in this small volume, has endeavored to give a comprehensive but popular account of the important uses which have been found for compressed air. He says particularly that it is not a scientific exposition, but he has endeavored merely to describe the principal uses of compressed air in a common sense way and to suggest some further possible uses. The most important and in fact the earliest important application of compressed air has been to rock drilling, and in this America took the lead at the Hoosac Tunnel, and this has been carried to such perfection that the author cites the case of the work at Niagara Falls, where 7,250 feet of tunnel was excavated in six months.

The influence of the rock drill operated by compressed gas upon the mining industry has been very far reaching indeed, for it has been one of the causes of the fall in the price of silver, which is causing so much trouble in the world now, and which many intelligent men have attributed to very occult causes. Doubtless, were it possible for us to know the facts, we should find that the price of gold has also fallen through the years, instead of appreciating, as so many philosophers like to tell us it has. Fortunately, for the convenience of mankind, the fluctuations in the price of gold are not rapid, but doubtless the fall in its price as measured by its purchasing power will diminish still more in the future through the same agency, compressed air, as applied to rock drilling. Mr. Rand tells us that within three years rock drills have been largely introduced in the mines of the Johannesburg, South Africa, where now about 300 such machines are used, and where gold is now produced at the rate of \$2,000,000 a month. By way of proving this, he shows us a photograph of two negroes wearing absolutely nothing but breech clouts, operating a Rand drill.

We shall not attempt to catalogue the interesting applications of compressed air which Mr. Rand has collected. Many of them are already very familiar to our readers. It is interesting to note, however, the fact that blast furnaces are now tapped by compressed air drills, that air brakes have been successfully applied to street cars, the pressure being pumped up by power taken from an axle by means of an eccentric, that the air brush for painting has been perfected and is now in wide use, and that with the help of compressed air a Frenchman has been able to make silk out of wood pulp.

Journal of the Franklin Institute for May.—This issue of the *Journal* contains the report of the Committee on

Science and the Arts on the barlock typewriter, invented by Charles Spiro. The Committee recommends the award of the John Scott Legacy Premium and Medal for this improvement. A paper of considerable length, which is only begun in this number, is on Gas Burners and the various means for obtaining good illumination, by Mr. William Paul Gerhard. Two of the lectures reported are the Electric Motor, by Prof. Crocker, of Columbia College, New York, and Emery and Other Abrasives, by T. Dunkin Paret, President of the Tanite Co. The latter is really a very thorough monograph, only the first part of it being given in this issue. The publication of a series of lectures on Engineering Practice and Education, by Prof. Gaetano Lanza, of the Massachusetts Institute of Technology, is also begun in this number.

Journal of the Association of Engineering Societies.—February, 1894.—A short paper in this issue is on Irrigation from the Yellowstone River, by Charles Tappan. A more valuable one is Water Power, its Measurement and Value, by George A. Kimball, member of the Boston Society. This, with the discussion, fills 44 pages. There is also a long paper on Sewage Disposal at Canton, O., by Mr. L. E. Chapin, of the Civil Engineers' Club of Cleveland, and a memoir of Mr. Richard Forbes, of the Boston Society. The official Proceedings and the Index to Current Literature, together with the new departments of the *Journal*, also appear.

TRADE CATALOGUES.

Cableway Sketches. Second Edition. The Lidgerwood Mfg. Co., 96 Liberty street, New York, 1894.

The Lidgerwood Co. has just issued a somewhat enlarged catalogue of its hoisting and conveying devices as used in building dams, piers, etc., also in logging, quarrying, open pit mining, and handling coal or packages. The well-known Austin dam cableway is illustrated, and a new one is shown still longer, that is the Point Pleasant cableway, erected for Messrs. Smyth & Munford, contractors for lock and dam No. 11, Great Kanawha River, W. Va. This is said to be the longest hoisting cableway in existence, having a clear span of 1,505½ ft. The main cable is 2½ in. in diameter, and the maximum net load handled is four tons. The cableway carries the stone direct from the quarry to the lock and dam. A seam of coal underlies the quarry and furnishes fuel for the machinery used on the work, this coal being also carried by the cableway. Various special devices are shown, as are the Lidgerwood hoisting engines, the rapid unloader and logging plant.

A Gurley Souvenir Catalogue. Messrs. W. & L. E. Gurley, of Troy, N. Y., issue a souvenir catalogue of the World's Fair. It is a pamphlet of 70 pages, and they say its aim is illustration, not description. It is a very brief account of the organization and growth of this well-known house and an excellent collection of the great variety of instruments made by it. These of course are so well-known to our readers that we do not need to name them. There are several views of the interior of the shops, and altogether the pamphlet is a good example of what it purports to be, an illustrated souvenir of the World's Fair.

National Convention of Railroad Commissioners.

The sixth annual convention of State and National Railroad Commissioners was held in Washington, D. C., on May 8 and 9. Commissioner Hill, of Virginia, Chairman of the Committee, was unable to preside, and Mr. Woodruff, of Connecticut, was chosen Chairman. With the Interstate Commerce Commissioners (all of whom, except Mr. Morrison, were present) representatives of freight bureaus, and Mr. D. A. Waterman, of the Association of American Railway Accounting Officers, there were about 40 gentlemen present. The first business was the report of the Committee on Pooling, which will be found in another column, of this paper. Before the discussion of this report a letter was read from Mr. E. P. Wilson, Chairman of the Executive Committee of the National Transportation Association, which represents 23 Boards of Trade or similar bodies in all parts of the country and assumes to represent the sentiments of 40,000 merchants. The letter emphasized the injury resulting to business from the long delay by Congress in acting on the railroad bills now pending before that body, and urged all interested to unite in a strong movement to secure the passage of the bill abolishing the imprisonment clause of the Act to Regulate Commerce and substituting therefor a clause punishing railroad corporations for violations of the law. A general conference of the Association represented by Mr. Wilson, the Interstate Commerce Commission and representatives of the railroads, to be held in Washington at an early date, was deemed highly desirable. The National Transportation Association has appointed a permanent committee to consider the question of amendments to the Interstate Commerce law.

On motion of Mr. Paddock, of Illinois (who, by the way, was the only ex-Commissioner present on Wednesday), a committee of three was appointed with power to confer, as suggested by Mr. Wilson.

Mr. Mills, of Minnesota, moved the adoption of the minority report (against legalized pooling). After referring in general terms to the necessity of keeping competition active, he said:

It was suggested in the report that interior points were

suffering. I can see no reason why interior points should suffer by the law preventing pooling, unless we can say that our Interstate Commerce law is at fault and cannot be enforced, and that our State railroad laws cannot be enforced, or are not enforced. They both provide that nothing but a reasonable rate shall be charged by carriers, and a tribunal is provided by which the rate charged can be investigated, and, if found unreasonable, it can be reduced. Now, if the carrier gets a reasonable rate for transportation it certainly should be satisfied. If the carriers in the management of their business between them see fit to cut their rates for the benefit of the community it is the carriers' business and no one's else. I think at central points—where carriers center—there should be just as healthy competition as you find between merchants in your own town. It is not our business to take care of their interests. They have the brightest minds in the country to take care of their interests for them. Where there is a healthy competition between them the people get the benefit of it, and if they are allowed to pool their rates, why, the people are the sufferers.

Interstate Commerce Commissioner Knapp then took the floor and made a general argument in favor of the repeal of the anti-pooling section. He said:

To my mind a system of Government regulation which starts upon the proposition that all rates shall be just and reasonable, and which forbids every species of discrimination, whether between individuals, localities or commodities, is irreconcilably at variance with the theory of actual competition in the charges and rates of public carriers. It seems to me, therefore, that the present law presents this curious anomaly, that it seeks to enforce compulsory competition between rival railroads by the mandate of the statute, and at the same time seeks to punish as misdemeanors the methods, inducements, practices and concessions by which in all other kinds of business competition is carried on. There can be but one reasonable rate between any two points; if there are competing railroads they must, according to the law, all charge this rate, and, this being so, how can there be any competition between them? If you analyze the proposition, it is apparent that any device, any inducement, any allurement, or any concession by which it is sought to get a different rate, a more favorable charge than that which is indicated by the published tariff, is distinctly and necessarily hostile to the idea of impartial treatment. Discrimination between individuals has been much discussed, but discrimination between commodities or between communities has not received sufficient attention.

Now, experience seems to me to demonstrate that, under present conditions, there is no effective, practical way of dealing with these many-sided offenses which occur through a violation of the public tariff except to remove the inducement to those practices. You must bear in mind that the public conscience is not educated up to a point where it regards the cutting of a rate as involving any moral turpitude. Most business men, I venture to say, upright as they are in their business life, are not impressed with the notion that it is a violation of the law and an offense against good morals to get better rates of transportation than their neighbors.

But, with things as they are, the practical question is how to deal with those offenses. How will you bring it about unless the inducement to commit misdemeanors of that description is taken away? If, as the law requires and as we must all concede, the rule of reasonable, just and impartial treatment compels all the rival carriers between two points to charge everybody alike, then it will inevitably happen—it must be, in the nature of the case—that the line having the shortest distance, the easiest grades, the best equipment, the superior terminal facilities, the essential appliances for handling the traffic, is the line to which that traffic will gravitate. It only obeys a natural law when it seeks that particular line of carriage which will accomplish the service with the greatest expedition and the utmost safety.

When you have actually prevented any discrimination in rates between persons, and have gotten the law so completely enforced that the same charge is in every instance exacted from every shipper, then the best line is the carrier which commands the traffic. And what are you going to do with the other lines? If a portion of that competitive business is absolutely essential to their support, as it often is, if they must have it as the alternative of bankruptcy, their managers and agents will resort to every inducement and practice necessary to secure it. The law of self preservation, the law of self-perpetuation in such instances, will override all the mandates of the law, and I do not believe myself that, under present conditions, it is any more possible to prevent absolutely these individual discriminations, this secret rate cutting, these private rebates, and to enforce absolutely and everywhere through this country the law of impartial treatment, than it is to enforce a law against swearing. When the temptation comes the offense will be committed.

The real function of a regulating body like the Interstate Commerce Commission (after laws have been passed removing the inducement to discriminate) lies in the direction of determining, in particular instances, when particular rates are challenged, what is the standard of compensation. Of course the privilege of pooling, which the railroads ask for, is an extraordinary one and should be surrounded with restrictions and conditions to protect the public. It will not do, however, to judge the probable effect of pools by experience in that line previous to 1887, because then, pools being held by the courts as contrary to public policy and unenforceable, railroads constantly evaded their obligations. Congress can devise a system of laws under which the privilege of pooling can be revoked by the order of any designated officer, or by the decree of a proper tribunal. The gravity of the business is so great, however, that it will often happen, no doubt, that one or the other of the parties to a pool would want to back out, and the Commission would, therefore, need to have pretty broad powers, the power to reach and correct any and all unlawful practices existing under any pool.

Mr. Knapp then spoke of some of the public discussions on the Interstate Commerce law which have taken place lately. The decision excusing witnesses from giving testimony that would incriminate themselves practically reverses law which has been in effect, and acted on, since 1865. It does not refer particularly to the Interstate Commerce law, although, of course, the Commission suffers under it the same as other prosecuting officers. Another great hindrance to the Commission is the absence of a provision in the law requiring complainants before it to present their whole case. As any one can appeal from the decision of the Commission to a United States Court, and there present new evidence, it is a waste of time to present a case to the Commission.

The Interstate Commerce Commissioners have lately had repeated conferences with the Congressional committees in reference to preparing an omnibus bill to amend a number of sections of the present Interstate Commerce Law.

Mr. Fort, of Georgia, followed Mr. Knapp, speaking in favor of the minority report. He thought the Interstate

Commerce Commission should be invested with rate-making power.

On Wednesday there was further brief discussion of the report, and a resolution was adopted favoring pooling, "provided conditions be imposed which will protect the public from excessive charges." The vote on this resolution was, yeas 19, nays 8, as follows:

Yeas:—Messrs. Knapp, Yeomans, Clarke (Ala.), Robertson (Conn.), Thayer (Md.), Cogswell (N. H.), Beddingfield (N. C.), Stewart (Penn.), Woodruff (Conn.), Dey (Ia.), Billings (Mich.), Kirkby (Ohio.), Brown (Penn.), Seymour (Conn.), Bulkley (Md.), Bellows (N. H.), Wilson (N. C.), Archer (Ohio), Duncan (S. C.).

Nays:—Messrs. Fort (Ga.), Teisberg (Minn.), Cook (Mont.), Lape (Ill.), McLaurin, W. (Miss.), Akers (Va.), Yantis (Ill.), Askew (Miss.).

The report of the Committee on Uniform Classification, made by Messrs. Mills of Arkansas, Billings of Michigan, and Duncan of South Carolina, was read by the Secretary. It is held that a classification for general merchandise would be feasible, leaving the field for commodity tariffs open, and recommended that Congress compel the adoption of such a classification within a fixed time. The principal discussion on this report was in the shape of a paper by Mr. James Peabody, of the Railway Review, who presented a careful study of the existing confused conditions in rate-making. He showed the very unsatisfactory basis on which nearly all tariffs are constructed, citing examples where the relation between the rates of different classes (in different items of the same tariff) varied in the most confusing manner. Picking out all the items in which the third class rate was 40 cents, he found the difference between first and second to vary from 7 to 15 cents, between second and third from 7 to 21, and so on, the differences varying from 66 per cent. to 213 per cent. Mr. Peabody held that a systematic basis should be prescribed for the relations between the different classes, and went on to elaborate a similar basis for commodities, making the rate on each agricultural product, for instance, always a certain percentage of that on one standard article, say wheat. The same rule would be applied to mineral products, forest products, etc. Mr. Peabody conceded that such a classification could be established only by legislative action. The report of the Committee on Uniform Classification was adopted.

The report of the Committee on Abuses caused by the use of shippers' cars, was prepared by Mr. Isaac B. Brown, Deputy Secretary of Internal Affairs of Pennsylvania, Commissioner Sanford, of Massachusetts, Chairman of the Committee, having been unable to attend to it. The paper gives several pages to a review of old laws in Pennsylvania in which the right of shippers to have their own cars hauled over railroads is recognized. That portion of the report detailing the present state of these matters is carefully written, but tells mostly well-known facts. It is asserted that in the bituminous coal regions of Pennsylvania, shippers who furnish their own cars have a marked advantage over their competitors when cars are scarce. Mr. Brown thinks that if a railroad company is unwilling to supply cars for a traffic in which it is known that shippers' cars are earning from 25 to 50 per cent., the stockholders of such railroads should change managers at once. Mr. Brown is free to assert that much of the discrimination would disappear if railroad managers would abandon their interest in private cars. The constitution of Pennsylvania prohibits railroad officers and employees from being interested, directly or indirectly, in the business of transportation as a common carrier over the lines of the company for which they work, and the conclusion of the paper is that the Interstate Commerce law ought to be amended so as to embody this principle. No railroad officer or employee should have any interest in the equipment used on his road. There should also be a law regulating the mileage rates so that shippers' cars should earn only a reasonable interest on the investment. If this legislation should be ineffectual it would then be necessary to prohibit the use of any but common carriers' cars.

The foregoing report was unanimously adopted and the report of the Committee on Statistics, prepared by Professor Henry C. Adams was presented. Its tenor is indicated by the following resolutions, which were presented by the Committee:

Resolved, First, that a classified statement of freight earnings would be of great advantage to the members of this convention in the performance of their respective official duties, and that page 63 of the Form of Annual Report from Carriers be so modified as to call for a statement of freight earnings on a basis of the classification of commodities there shown. This information shall be demanded for the first time in the report of the year ending June 30, 1896.

Second, that it is the sense of this convention that a clearing house of freight and passenger revenue accounts is highly desirable, and that Congress and the Legislatures of the several States be urged to give all necessary encouragement to the establishment of such an institution.

Resolved, First, that in making their reports to State railroad commissions the railroad companies shall apportion to each State, on a mileage basis, its proportion of cost of road and equipment, its proportion of stock, funded and other debt, and its proportion of fixed charges.

Second, that the apportionment of operating earnings to each State shall be on the following basis: Each State shall be credited with all the earnings derived from business originating and terminating within such State; on business coming into, going out of, or through such State, the earnings shall be pro-rated in proportion to the average of local charges on such business in the respective States and on the respective lines.

Third, the earnings and income from other sources than transportation shall be credited to each State on a mileage basis.

Fourth, that operating expenses shall be charged to each State on the basis of train mileage in such State.

Fifth, that reports on the above basis shall be made the first time in the reports for the year ending June 30, 1895.

The report we have received fails to state what action was taken on these resolutions.

The Chairman appointed as Committee to draft the act relating to uniform classification of freights, Mr. Mills, of Minnesota; Mr. Bellows, of New Hampshire; Mr. Duncan, of South Carolina; Mr. Kirkby, of Ohio; Mr. Billings, of Michigan; and Mr. Bulkley, of Maryland.

On motion of Mr. Seymour, of Connecticut, the Chairman was empowered to appoint a committee of five to select a Chairman and Secretaries for next year's convention, and to solicit subjects and papers therefor either from members or from outsiders. The Chairman appointed on this Committee, Mr. Brown of Pennsylvania; Mr. Luke, of Iowa; Mr. Yantis, of Illinois; Mr. Rea, of California, and Secretary Moseley; and later they reported for permanent officers of the next convention, Hon. Allen Fort, of Georgia, Chairman; Hon. A. K. Teisberg, of Minnesota, Vice-Chairman; Hon. Edward A. Moseley, of the District of Columbia, Secretary of the convention and of all the committees, and Hon. Martin S. Decker, of New York, as Assistant Secretary. This report was unanimously adopted.

An informal discussion on possible legislation to prevent trespassing on railroads by walking on the track, then took place, the most salient point of which was, that in the West people cherish as one of their dearest privileges the right to take their lives in their own hands. Juries have found for the plaintiff, where a man, killed on the track, saw plainly the approaching train, but would not step out of the way because it was a little muddy.

The next thing in the order of business was a paper on stock and debt watering, by Hon. George G. Crocker, of Massachusetts, which we are obliged to postpone for lack of space.

Resolutions of sympathy and appreciation were passed on the deaths of Hon. James W. McDill and Hon. Augustus Schoonmaker, which have occurred since the last convention.

Railroad Matters in Chicago.

Passenger Traffic.—There is little new to record in the condition of passenger traffic, and although passenger agents are devising means to increase summer travel by making favorable excursion rates to attractive localities, they admit that the prospects of any considerable success are not flattering.

Freight Traffic.—The past week failed to show any improvement; the majority, if not all the Granger roads, suffered a further decrease in the aggregate of their general business. The deliveries at Chicago for the week by the ten leading roads being 64,796 barrels of flour, and 2,326,000 bushels of grain, 55,240 head of cattle, 108,000 hogs, and 59,148 sheep, against 58,073 barrels of flour, 2,652,000 bushels of grain, 48,782 cattle, 123,600 hogs, and 54,693 sheep the week immediately preceding, and 72,050 barrels of flour, 2,905,000 bushels of grain, 57,267 cattle, 104,000 hogs, and 66,921 sheep the week ending April 15, 1893. The roads are also suffering from the shrinkage in coal traffic, and although it is said that active steps are being taken to settle the miners' strike, a resumption of a sufficient volume of mining to give the railroads employment for the coal trains can scarcely be looked for before June.

The outward movement of merchandise and miscellaneous freight from the city to the interior is also moderate, although the aggregate is not generally conceded to be less than a year ago, unless it is found in shipments of iron and other materials to manufacturing establishments at interior points, which draw large supplies from here, but which are now closed on account of the miners' strike. The strike of the iron miners at points along the lines of Chicago roads traversing the iron region is also felt by such roads, but it is thought that business will be actively resumed in a few days, and predictions are ventured that the traffic of the lines referred to will be larger the coming summer and autumn than the same time last year. On the whole, it is a waiting situation, and the officers of even the best located and most conservatively managed lines express the opinion that they see little to warrant the expectation that they will be able to earn more than expenses and fixed charges the coming three months.

The following shows the deliveries of grain (bushels) at Chicago by the leading Western railroads for the week ending May 12, and the corresponding time the two preceding years:

	1894.	1893.	1892.
Grain.	Grain.	Grain.	Grain.
C. & N. West	529,000	446,000	321,000
Ill. Cent.	231,000	429,000	227,000
C. R. I. & P.	266,000	20,000	242,000
C. B. & Q.	431,000	896,000	690,000
C. & Alton	80,000	76,000	119,000
C. & Ill.	31,000	66,000	36,000
C. M. & St. P.	394,000	401,000	357,000
Wabash	180,000	196,000	68,000
C. & Grt. W.	60,000	100,000	143,000
A. T. & S. Fe.	117,000	230,000	264,000
L. N. A. & C.	7,000	2,000	—
Total bush.	2,326,000	2,862,000	2,467,000

The deliveries of flour (barrels) at Chicago by the leading Western railroads for the week ending May 12, and the corresponding time the two preceding years compare as follows:

	1894.	1893.	1892.
Flour.	Flour.	Flour.	Flour.
C. & N. West	8,458	14,155	19,052
Ill. Cent.	300	1,280	—
C. R. I. & P.	12,450	5,400	7,500
C. B. & Q.	15,490	23,901	12,943
C. & Alton	5,856	1,020	5,876
C. & E. Ill.	750	350	250
C. M. & St. P.	12,000	25,350	15,375
Wabash	900	600	5,095
C. & Grt. W.	8,592	23,644	10,395
A. T. & S. Fe.	—	600	165
L. N. A. & C.	—	—	—
Total bbls.	64,796	96,300	76,651

The number of car loads of grain delivered at Chicago by the leading Western railroads for the month of April and for the corresponding time the three preceding years compare as follows:

	1894.	1893.	1892.	1891.
A. T. & S. Fe.	793	796	986	641
C. & Alton	716	441	839	864
C. B. & Q.	2,032	4,800	2,626	2,018
C. & E. Ill.	169	308	312	238
C. M. & St. P.	2,021	2,049	1,657	1,502
C. & N. West	1,736	1,816	1,714	2,073
C. R. I. & P.	1,730	957	1,338	1,852
C. & Grt. W.	379	924	504	347
Ill. Cent.	1,461	1,868	2,020	2,507
Wabash	840	560	549	547
Wis. Cent.	21	19	11	11
Other roads	1,706	2,762	2,441	12,600
Total cars	13,604	17,300	14,997	13,608

Curtailing Expenses.—The predictions made in last week's letter of a further curtailment of expenses by the Western railroads are already being verified, as all the lines have either made a move in that direction, or will do so in the near future. Not only have the lines having a large coal tonnage laid off a large number of trains, but because of a present or prospective scarcity of fuel they have suspended repairs where such work was not immediately necessary, and dismissed a good many crews employed in the construction departments. A like course is being pursued in the repair shops of the majority of the lines, where the employees are given the choice of a general reduction of wages or a lay-off of part of the hands. On the majority of roads the employees accept the proposition to reduce the working force, the operatives in the Chicago, Milwaukee & St. Paul shops being pronounced in their preference for the latter. On the Chicago, Burlington & Quincy the men are retained, but the working hours are curtailed. The decreased business has materially lessened office work, and it is stated that the process of curtailing pay rolls in that department is going forward. Advices from St. Paul state that the Great Northern is dropping a long list of employees since the recent strike. Every department of the service will, it is said, show a material reduction in the list of employees.

The strike at the Pullman Car Works here, by which 3,500 men are idle, like that on the Great Northern, is under the direction of the American Railway Union. The conservative men admit that there was no trouble until the Union was organized, when a number of the poorest workmen, many of whom had received favors from the company in the way of extension of indebtedness for rent, conceived the idea that they were not only abused, but must have more pay. They were kindly met by the officers of the company, including Mr. Pullman, and assured that their complaints of ill treatment should be thoroughly investigated, and if found correct the evil would be remedied. The fact that the company had for months been taking work at a loss for the sake of giving the men employment rendered an advance in wages out of the question. This statement was received in good faith by a large percentage of the best men but was unsatisfactory to the agitators, and the great Pullman Works were shut down indefinitely. The threats that a general strike will follow among the employees on all the Pullman sleepers on the various railroads upon which they are run, and that the latter will not be permitted to handle such cars, does not apparently trouble the managers of the Chicago roads. The latter state that they do not expect trouble with the employees, but should it come, all the lines interested will act as a unit in fighting the strike, and the American Railway Union is likely to have a bigger job on hand than was ever before assumed by a similar organization.

CHICAGO, April 12.

TECHNICAL

Manufacturing and Business.

Mr. T. W. Ridsdale, formerly of the Worthington Pumping Engine Co., and Mr. T. A. Lewis, until recently with Henry R. Worthington, have formed a co-partnership under the firm name of Ridsdale & Lewis, with offices at 39 and 41 Cortlandt street, New York. The new firm will do an export and domestic business in machinery and supplies, entering actively the engineering field and also largely the railroad field, for which their past experience eminently qualifies them. Mr. Ridsdale still remains Secretary and Treasurer of the Duval Metallic Packing Co., the success of which packing, we are informed, has proved very marked, and the new firm will push the sale of the same with increased energy and facilities.

Iron and Steel.

The Lackawanna Iron & Steel Co. has purchased Robert H. Coleman's interests in his properties at Cornwall and Lebanon, Pa., including the furnaces, Cornwall ore hills and Cornwall & Lebanon Railroad. Mr. Coleman retains

the mansion at Cornwall, two farms and the Colebrook estate, which includes Mt. Gretna. The total sum paid is about \$3,000,000. The purchasers, it is said, will shortly build two new furnaces at Lebanon or Cornwall.

New Stations and Shops.

The Canadian Pacific will build a new station at Windsor, Ont., on the site of the present one, at a cost of \$12,000.

Superintendent A. M. Nelson, of the Kansas City, Pittsburg & Gulf Railroad, is preparing the plans for the new shops of that road, at Pittsburg, Kan.

The Lucania.

The Lucania and Campania are again in training, and the Lucania's trip ending May 12, came within 42 minutes of her best previous record of 5 days, 13 hours, 11 minutes, made on March 16 of this year. Her time was 1 hour, 46 minutes slower than the Campania's best time, made on November 3, last. The best run for a single day was made on the 9th inst., when she covered 524 knots, which is the best day's run ever made in an eastward passage. This is equal to a little over 542 knots on the meridian, or 560.7 knots on a westward trip, which is only .07 better than the Lucania's record of last season on her best day's run to westward. The run of 524 knots to eastward is equal to 22.6 knots an hour on the meridian, or about 26 miles.

The Trial of the Northwest.

The trials of the Northwest are to test not only the boat and its quadruple expansion engines, but also the Belleville boilers. The first run of about 120 miles was satisfactory on all points. The pressure on the boilers was not above 200 lbs., and the maximum number of revolutions was 108 a minute. Under these conditions a run of about 19 miles was made in 55 minutes. As these boilers are to carry 250 lbs., and the screws are to make 125 revolutions, there is no doubt that she will make the specified 20 miles a hour. It is stated that there was no trouble from heated bearings, and the only noticeable vibration was just aft of the open engine room. The registered tonnage of the boat is 4,229 gross, and 2,981 net. The horse power is rated at 7,000. During the trial she drew 14 ft. forward and 14 ft. 7 in. aft.

Interlocking.

The New York Central & Hudson River Railroad has awarded the contract for an interlocking plant at Syracuse Junction, where its four tracks are crossed by a branch of the West Shore Railroad to the National Switch & Signal Co., of Easton, Pa., New York office, 32 Liberty street. A 24 lever National machine, with Pfeil special locking, will operate eight switches, five facing point locks and 17 signals, requiring 21 working levers.

THE SCRAP HEAP.

Notes.

Another suit has been filed at Baltimore, asking that a receiver be appointed for the relief department of the Baltimore & Ohio railroad.

The pipe of the United States Pipe Line was maliciously drilled near Athens, Pa., last week and the escaping oil ignited. At the same time the company's telegraph line was cut.

The freight house of the Pittsburgh, Cincinnati, Chicago & St. Louis at Columbus, O., was burned on the night of May 10, together with 17 freight cars. A man was burned to death in the fire.

The United States Supreme Court has sustained the Ohio law assessing a tax of one-tenth of one per cent. upon the capital stock of companies seeking consolidation. The hearing was on the case of the Wabash.

The Brooklyn Elevated Railroad now closes its ticket offices between 1 a. m. and 5 a. m. and the fares during those hours are collected by the conductors. The ticket sellers will now work ten hours a day, men receiving \$1.67 and women \$1.20.

In Jacksonville, Fla., certain railroad employees have started an organization with the avowed object of opposing legislation which is likely to unjustly discriminate against railroads and their employees, especially that looking to the establishment of a railroad commission. A similar movement is reported from Louisville, Ky.

The Boston & Albany Railroad has been indicted on a criminal charge by the grand jury at Springfield, Mass., in connection with the death of Express Messenger Sedgwick, who was killed at the Chester bridge disaster on August 31, last. Under the law of Massachusetts, an indictment of this kind, if sustained, makes the railroad company liable for damages to all persons lawfully upon a train and not to passengers alone.

The Hudson County Grand Jury at Jersey City, N. J., has made a presentment, charging that the manager of the Western Union Telegraph Co. in that city is a confederate of dealers in counterfeit money, who receive messages at his office. The manager denies that he knows the persons receiving the telegrams in question. They had their messages sent to a fictitious address and then left the correct address at the telegraph office.

A bill has been introduced in the Ohio Legislature, making important changes in the method of appraising railroad property for taxation. Mr. McBride has introduced a bill in the same body, requiring interlocking signals at crossings of steam railroads with electric or cable roads, and making it unlawful for electric or cable cars to cross each other's lines without first coming to a stop. The Senate of the New Jersey Legislature has passed a bill making it unlawful for railroad companies or other

employers to require their employees to renounce existing or future membership in any labor organization.

Successful Trial of Armor Plate.

A successful test of Bethlehem Iron Co. armor-plate was held at the proving ground of the company, at Redington, May 15. Between 375 and 450 tons of Harveyized 8-inch turret-plates for the monitors Monadnock and Puritan and the battle-ship Maine were accepted by the Government. The plate tested was 8 in. thick, 16 ft. long and 5 ft. 3 in. high. Two shots were fired at it from a 6-inch gun. Hollister projectiles weighing 100 lbs. were used. The projectiles penetrated the plate two or three inches, and were shattered. Not the slightest crack was made in the plate. An experimental shot at the plate was made after it had passed the test, a 250-lb. projectile being fired from an 8-inch gun, which had a charge of 91 lbs. of powder. The missile attained a velocity of 1,835 ft. It cracked the plate, but did not injure the backing.

A Decision on Pooling.

The United States Circuit Court of Appeals at St. Paul has affirmed the decision of the United States Court for the Eastern District of Missouri in the case of the Chicago, Milwaukee & St. Paul Railway vs. the Wabash, St. Louis & Pacific. These two roads, with five others, signed a pooling agreement in 1883, providing for a division of traffic. In the course of business the Wabash carried more than its share and the Milwaukee carried less. It was decided by the pool commissioner that the Wabash should pay the Milwaukee \$18,404.04, and suit was instituted for that amount. The Court holds that the plaintiff's action was based on an illegal contract; that with the contract ignored there is no cause for action, and accepting the contract it states an illegal and void cause for action, and the courts will not lend their aid to enforce any contract contrary to law or public policy.

Blast Furnace Capacity.

The weekly capacity of the furnaces in blast on the first of May, in the United States, was 104,472 tons, as compared with 132,383 tons on the first of April. This very serious decline in production, when a slight increase might reasonably be looked for, follows the disturbance due to the very general strike of the bituminous coal miners, which has resulted in a decrease of 27,344 tons in the capacity of bituminous and coke furnaces, and 977 tons in the furnaces using anthracite and coke mixed, and a gain of 410 tons in the weekly output of charcoal furnaces.

Lake Notes.

Coal is becoming so scarce on account of the strike that it is proposed to send coal now at Duluth and Superior back to Ohio ports. Vessel men speak of 8 cents per ton, coal free in and out.

The St. Mary's Falls Canal, which opened on April 17, as against May 1, in 1893, had a traffic during the 14 days of April of 195,505 net tons; 128,156 tons of this was east-bound. The large items in this traffic were: Wheat—921,466 bushels, corn, 163,300 bushels, flour, 302,480 barrels, iron ore, 56,501 tons; 58,450 tons of coal were carried westward.

Iron Ore on Lake Erie Docks.

The Iron Trade Review and the Marine Review publish the following iron ore statistics. The aggregates of iron ore on Lake Erie docks on the first of May for the 10 years just past have been as below:

Year.	Gross Tons.	Year.	Gross Tons.
1885	556,657	1890	936,228
1886	373,321	1891	2,662,223
1887	149,304	1892	1,537,188
1888	703,720	1893	2,095,797
1889	588,753	1894	2,588,370

A larger proportion than usual of the ore left on the docks this season is thought to be Bessemer. The shipments to furnaces during the past winter were 1,512,340 tons, as compared with 2,053,654 tons in the winter of 1892-93.

BRIDGE BUILDING.

Alliance, O.—Preliminary surveys for the bridge over the Fort Wayne and Cleveland & Pittsburgh tracks, which divide the two business portions of the city, have been made by Fort Wayne officials and plans will shortly be submitted to the local Council.

Baltimore, Md.—Proposals were opened May 8 at the Mayor's office for the construction of an iron bridge over the Baltimore & Potomac Railroad track, on Edmondson avenue. The bidders were: The Youngstown Bridge Co., \$21,194; R. H. Hood, \$22,970; Campbell Zell Co., \$24,997; Sanford & Brooks, \$26,925. The contract was not awarded. The bridge will be 100 ft. wide and 90 ft. long in one span. The bridge will also have two roadways, each 24 ft. wide, and two sidewalks each 12 ft. wide.

The contract for the construction of a bridge over Gwynn's Falls, on Edmondson avenue, has been awarded to the Youngstown Bridge Co., of Ohio, for \$21,194.

Bethlehem, Pa.—President A. Johnson, of the Lehigh Valley Traction Co., has offered to give \$25,000 toward a free bridge at Bethlehem.

Brookline, Mass.—Proposals will be received by the park commissioners until May 22, for building the superstructure of an iron footbridge over the tracks of the Boston & Albany Railroad at Chapel station.

Buckhannon, W. Va.—The Canton (Ohio) Bridge Co. last week completed a new steel highway bridge over the Buckhannon River at this point for the county commissioner.

Chestertown, Md.—The commissioners of Kent and Queen Anne Counties have received the report of the Civil Engineer appointed to make an examination of the drawbridge spanning Chester River at this place. It will cost \$10,000 to rebuild it. No action has as yet been taken.

Cleveland, O.—A bill has passed the lower House of the Legislature authorizing the commissioners of this county to issue \$60,000 in bonds to build a bridge over Chagrin River, this county.

Cleveland & Pittsburgh Railroad.—This company has been at work for nearly two years rebuilding and strengthening all the bridges along the river division between Wellsville and Bellaire, Ohio. A force of men is now at work on the bridge over Wheeling Creek, at Bridgeport, Ohio, and when it is finished there remain but four more bridges needing attention between Bridgeport and Bellaire. Thus far, 77 bridges have been overhauled.

Cumberland, Md.—The county commissioners of Allegany County, Md., have accepted from the Bracket Bridge Co. a new bridge over George's Creek, in that county. The new bridge cost \$5,980.

Dayton, O.—A bill has passed the House in the Legislature authorizing this city to issue \$12,000 in bonds for the purpose of building a bridge over the canal at Warrent street.

Elliott City, Md.—The commissioners of Howard County have decided to replace the wooden bridge at Sykesville with an iron structure; also to rebuild the other bridges damaged by the recent storm.

Fredericton, N. B.—Proposals will be received until May 22 for building the sub-structure of the Ferry Point bridge, between Calais, Me., and St. Stephen, N. B., by George A. Murchie, Mayor, Fredericton, N. B.

Homestead, Pa.—The bill authorizing the Braddock & Homestead Bridge Co. to bridge the Monongahela River at this point, passed without objection in the lower House of Congress, at Washington, May 14.

Kansas City, Kan.—Bids will be received until June 2 by the county clerk for the construction of an iron highway bridge over the Kaw River at Turner. The bridge will have four spans resting on masonry piers. The estimated cost is \$53,000.

Minneapolis, Minn.—Plans will be prepared by the City Engineer for a bridge at Fourteenth avenue, S. E., over the railroad tracks.

Muscatine, Ia.—The Board of Supervisors of Muscatine County has appropriated \$18,000 for the construction of a bridge over Cedar River.

McKeesport, Pa.—The Street Committee of Carcites, has decided to recommend the erection of a bridge at Hartman and Camp streets. One bid for \$465 for the erection of a bridge over Crooked Run at Gas street, from the Penn Bridge Co., was considered too high, and the City Engineer was instructed to re-advertise for bids.

New York City.—Governor Flower has signed the bill authorizing the construction of a new bridge between Pelham Bay Park and City Island.

Assemblyman Marrin's bill appropriating \$25,000 for the construction of a bridge over the Mott Haven Canal, at 138th street, New York City, has been signed by Governor Flower, and is now a law.

Niobrara, Neb.—The President has signed a bill to authorize the reconstruction of a bridge across the Niobrara River, near the village of Niobrara, Neb.

North Stratford, N. H.—A new street bridge is being put in on the Grand Trunk, at this town, in place of the one washed away by freshet three weeks ago.

Norwich, Ont.—The corporation will shortly invite tenders for an iron bridge.

Pickering, Pa.—A new bridge will be built at this place by the Pennsylvania to take the place of the structure burned May 8. It will be about 200 ft. long.

Piedmont, W. Va.—It has been definitely decided to build a highway bridge over the Potomac River between Piedmont, W. Va., and the town of Luke, Allegany County, Md. The matter has been under consideration several years, and the commissioners of both counties have passed ordinances agreeing to its construction. A conference between the two full boards was held at Piedmont on Friday last. The bridge is to be of steel, and will cost about \$12,000.

Pittsburgh, Pa.—The stockholders of the Sharpsburg & Lawrenceville Bridge Co. held their annual meeting last week. The following officers were re-elected: George Chalfant, President; R. M. Coyle, Secretary and Treasurer. C. H. Spang was elected to succeed the late Campbell B. Herron on the board. The project of increasing the capital stock of the company from \$79,000 to \$200,000 to build a new bridge was up for consideration, but no action was taken except in the appointment of a provisional committee to report at a special meeting in July.

Red Wing, Minn.—D. D. Smith, of St. Paul, has been awarded the contract for building the sub-structure of the wagon bridge across the Mississippi River at this place. The contract for the superstructure will be let soon. C. F. Loweth, C. E., St. Paul, Minn., is in charge of the work.

Revelstoke, B. C.—The Canadian Pacific Railroad Co. will build a new steel bridge over the Columbia River at this place, this summer.

South St. Paul, Minn.—Judge Willis has granted a temporary injunction restraining the city officers of South St. Paul from turning over to the South St. Paul Belt Railroad Co. the \$75,000 in bonds voted in aid of the bridge across the Mississippi River. The hearing on making the injunction permanent will be heard in a few days.

Sunbury, Pa.—Viewers have been appointed by the court to report upon the proposed bridges across the Susquehanna River between Herndon and Port Trevorton, and at McKee's Half Falls, Snyder County. A report will be made at the September term. The bridges will be inter-county structures.

Toledo, O.—A resolution has been presented to the Committee on Harbor, Commerce and Bridges calling for a new bridge at St. Clair street, but the solicitor suggested that it should originate in the Ways and Means Committee, with a provision for an issue of bonds, which the Harbor Commissioner thinks should be \$50,000. The present bridge is insufficient.

Towanda, Pa.—The court has appointed viewers to report upon the needs of county bridges over Bullard Creek, in Rome township, and between Standing and Asylum townships.

Westfield, N. Y.—At a meeting of citizens of Westfield township, held May 13, it was voted to build a new bridge on Main street, a sum not exceeding \$15,000 to be raised for that purpose. A special town meeting will be held May 28.

Woonsocket, R. I.—The Hamlet Avenue Bridge Commission has voted to build a wrought iron deck bridge, 34 ft. wide, and 524 ft. in length, with 8 ft. sidewalks, over the Blackstone River from Main street to Front street, and has awarded the contract to Dean & Westbrook, of New York, for \$177,900. The bridge will have three piers. The work will be commenced at once, and probably completed by June 1, 1895.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

North Pennsylvania, quarterly, 2 per cent., payable May 25.

Cleveland & Pittsburgh, quarterly, 1½ per cent. on the guaranteed stock, payable June 1.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Burlington, Cedar Rapids & Northern, annual, Cedar Rapids, Ia., May 22.

Chicago, St. Paul, Minneapolis & Omaha, annual, Hudson, Wis., June 9.

Duluth, South Shore & Atlantic, annual, Marquette, Mich., June 7.

Manchester & Lawrence, annual, Manchester, N. H., May 25.

Minneapolis, St. Paul & Sault Ste. Marie, annual, Minneapolis, Minn., June 5.

Northern, annual, Concord, N. H., May 31.

St. Joseph & Grand Island, annual, Elwood, Kan., June 12.

St. Louis, Alton & Terre Haute, annual, St. Louis, Mo., June 4.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Master Car Builders' Association* will hold its annual convention at Saratoga, N. Y., beginning June 12. The hotel headquarters will be at Congress Hall, H. S. Clements, Manager.

The *Master Mechanics' Association* will hold its annual convention at Saratoga, N. Y., beginning June 18.

The *American Society of Mechanical Engineers* will hold its annual convention in Montreal, Can., from June 4 to 9. The headquarters will be at the Windsor Hotel. The sessions of the society will be held in the Engineering Building of McGill University.

The *National Association of Local Freight Agents* will hold its annual convention at Pittsburgh, Pa., June 12, 13, 14. The headquarters will be at the Monongahela House.

The *Association of American Railway Accounting Officers* will hold its next annual meeting at Willard Hall, Washington, D. C., commencing May 30.

The *International Association of Car Accountants* will hold its annual convention at Old Point Comfort, Va., beginning June 19.

The *Western Railway Club* meets in the rooms of the Central Traffic Association, Monadnock Building, Chicago, on the third Tuesday in each month, at 2 p. m.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Wednesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the fourth Wednesday of January, March, April, September and October.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Northwestern Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m. The annual convention will be held at the Cataract House, Niagara Falls, N. Y., beginning June 20.

The *Western Society of Engineers* meets on the first Wednesday in each month, at 8 p. m. The headquarters of the society are at 51 Lakeside Building, Chicago.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Boston Society of Civil Engineers* meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Engineers' Society of Western Pennsylvania* meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December, when they are held on the second Tuesday only.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7.30 p. m.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineers' and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday in each month, at 8 p. m.

The *Civil Engineers' Society of St. Paul* meets on the first Monday of each month.

The *Scandinavian Engineering Society of Chicago* meets in Room 309, Title and Trust Building, 100 Washington street, on the third Thursday in each month.

The *Foundrymen's Association* meets at the Manufacturers' Club, Philadelphia, Pa., on the first Wednesday in each month.

Car Inspectors' Association.

The National Car Inspectors' Association convention met in Chattanooga, Tenn., May 10 and 11. The following officers were elected: Supreme Chief, Paul Seitzer, of Jersey City; Supreme Secretary, S. E. Evans, of Louisville; Supreme Treasurer, S. B. Davis, of Columbus, O. T. B. Duncan, of Columbus, was elected Supreme Or-

ganizer, and J. W. Brady, of Chattanooga, was appointed Supreme Chaplain.

Canadian Society of Civil Engineers.

A meeting of this society was held last week at Montreal. The Secretary read a letter from Mr. MacDougall, of Toronto, on the professional status of engineers, which letter was decided by the meeting to be referred to the committee, of which Mr. MacDougall is chairman. Mr. Butler's paper on "Cement Mortars in Freezing Weather" was again continued and commented upon by Messrs. Leonard and King, the former quoting some opinions of famous writers and his own experience on the subject, while the latter interested the meeting with the results of experiments made by himself during the past winter. Mr. Lordy, of New Brunswick, also read some correspondence he had on the subject from Prof. Spalding, of Cornhill University. Most of the evening having been taken up with this topic, Prof. Nicholson decided, with the meeting's approval, to postpone the reading of his paper intended for this meeting to the next one, to be held on May 24, the subject being "Theory of the Action of Pumps."

Engineers' Club of St. Louis.

The club met May 2, at 1,600 Lucas place, President Crosby in the chair, 35 members and 16 visitors present. The Secretary reported that the Boston Society of Civil Engineers had adopted a by-law providing for exchange of members with other societies in the Association. The following societies had previously taken similar action: Civil Engineers Club of Cleveland; Civil Engineers Society of St. Paul; Wisconsin Polytechnic Society; Montana Society of Civil Engineers, and the Engineers' Club of St. Louis, where the movement originated.

Mr. Robert Moore then read the paper on "The Filtration of City Water Supply in the Light of Recent Researches." He described primitive water supplies, and explained the development of the public water system for distribution over wide areas under pressure. Typhoid fever is directly traceable to water contamination. All water in streams is more or less contaminated. Pipes or wells sunk in sandy soil along side of streams afford natural filtration, but in only limited quantities, and the water itself is always inferior to that of the neighboring stream.

The first artificial sand filter was built by James Simpson in 1839, and proved so successful that its use was shortly afterward made obligatory on all water supplying companies in England. In 1866 Mr. Kirkwood made an extensive study of the problem of filtration on behalf of the city of St. Louis, visiting many foreign cities. His report, which embodies plans for a complete filter system for St. Louis, is in the library of this club.

Mr. Moore placed the cost of a filter system for the city of St. Louis at \$2,000,000, and the annual expense of operation, maintenance and interest charges at \$150,000. The adoption of filtration for the city's water supply was strongly recommended. In the discussion Mr. Holman stated that plans were being made and experiments conducted upon various systems. The water department would be ready to act in the matter when funds were available. In the further discussion it was stated that most of the work in the filter bed is done in a thin layer on the top, and that the cleaning process consists mainly of scraping off this layer whenever it became too dense to permit the ready flow of water. It was anticipated that the filtering of 50,000,000 gallons of water a day would cause a deposit of 1,000 tons of mud, but most of this would be taken out in the settling basins, where fully 90 per cent. would go down in the first eight hours. This would greatly lighten the task on the filters. It was shown that it would be desirable to treat the water with a coagulant, and also to cover the filter beds.

Those who participated in the discussion were Messrs. Seddon, Kineally, Crosby, and Drs. Green, Ravold, Sanger and Bryson.

American Society of Mechanical Engineers.

The Montreal convention of this Society will be held June 5 to 9, inclusive. The professional sessions will be held at the Engineering Building of McGill University, and the headquarters will be at the Windsor Hotel. The programme will begin with an informal drive on Tuesday afternoon, and Tuesday evening the opening session will be held. This will include addresses of welcome by the Mayor of Montreal, the Chancellor of the University, Professor Bovey, Dean of the Faculty of Applied Science, and Herbert Wallis, Esq., Chairman of the Local Committee. Wednesday morning, after preliminary business, professional papers will be taken up and an hour will be given to topical discussions, and in the afternoon a special train will be run by the Grand Trunk Railway to Lachine, and a steamer furnished by the Harbor Commission will take the party down the Lachine Rapids to Ile au Herron, where afternoon tea will be served and whence the party will go to see the dredging operations in the harbor. Wednesday afternoon there will be a general reception at the house of Sir Donald A. Smith. Thursday morning professional papers will again be taken up and the party will go to the Montreal Street Railway Company's power house for luncheon. After luncheon and an inspection of the power plant, the party will go to the shops of the Grand Trunk Railway. Thursday evening professional papers will again be read and again on Friday morning, including topical discussions, and this session of Friday will be the final business session. Friday afternoon a visit will be made to the works of the Canadian Pacific Railway, or the Canadian Rubber Factory, and later in the afternoon a garden party will be given at the house of Mrs. Mailson for the members of the Convention, Saturday will be given to an all day excursion to Ottawa by special trains on the Canadian Pacific. A number of minor excursions will be provided by the Local Committee.

New York Railroad Club.

Mr. Charles D. Meneely, of Troy, N. Y., read a paper on "The Substitution of Rolling for Sliding Friction in Journal Bearings," at the May meeting of the Club. There will be no meeting in June nor until September.

Ticket Brokers' Association.

The American Ticket Brokers' Association held its sixteenth annual convention at Washington, D. C., May 9 and 10. The election of officers for the ensuing year resulted as follows: President, H. C. Meader, Cincinnati; Chairman Executive Committee, George W. McKenzie; Secretary, W. B. Carter, Louisville, Ky.; depository, First National Bank, Chicago.

Civil Engineers' Society of St. Paul.

A regular meeting of the Civil Engineers' Society of St. Paul was held on May 7, 13 members and 6 visitors present. The paper of the evening was by Mr. O. Clausen, on the "Requirements of a Municipal Electric Light Plant Institution." He advocated the location of the power house near a plentiful supply of water that compound condensing engines might be used, yet far enough from the business centre to escape excessive cost of real estate and near enough to profit by transportation facilities, and to minimize length of pole lines. Tiled floors for engine and dynamo forms were suggested, rubber mats to be placed

where necessary for protective insulation. A traveling crane would assist in handling equipment. Machinery foundations to be massive and built of hard burned brick, laid in Portland cement. He favored low speed, triple expansion engines, water tube boilers, extra feed pump capacity, economizers and smoke consumers. Steam pipes to be furnished with magnesia casing and fitted with numerous valves in case of accidents. For arc lighting the general practice seems to demand shafting and belt connections, while direct connection between engine and dynamo is common for incandescent lighting. The direct constant current arc light machine is now constructed to operate in safe practice 100 2,000 candle power lamps, with a voltage of 5,000, and a current of 10 amperes. In this vicinity, with a first-class plant, a system of 1,000 lamps should be operated all night and every night at a total cost of \$90 per lamp per annum.

American Society of Civil Engineers.

At a meeting held on Wednesday evening, May 16, the papers read were "The Reconstruction of a Portion of the Sub-structure of the Johnsonville Bridge," by Walter A. Gahagan, Assoc. M. Am. Soc. C. E., and "A Failure of a Masonry Pier and a Rock Foundation," by William Barclay Parsons, M. Am. Soc. C. E. Abstracts of these were given in our issue of May 4.

At the meeting to be held June 6, a paper will be read by E. Lenthilhon, Jun. Am. Soc. C. E., of which the following is an abstract: "A Concrete Sewer on Piles." The work described in this paper, consisted in the building by the Dock Department, at the foot of Canal street, North River, New York, about 180 ft. of concrete sewer, 16 ft. wide by 7 ft. deep, on a foundation of piles and grillages, with overflow chambers, designed to carry the storm water and sewerage during very high tide. The area drained is 366 acres. The location of the work forbade the use of anything but floating derricks and other machinery in its construction, and all concrete, etc., had to be made on deck scows and wheeled to place. As the space for accommodation of the various scows, etc., was contracted, this added to the expense of the work.

Cast iron shoes for the piles were tried in driving through the cribs, but were not successful, and were abandoned. The cost per pile for labor was \$3.91. Two men at good low tide could saw off three of these piles during one tide at a cost of \$1.28 each. Those sawed off a greater depth were done by means of a large circular saw, suspended in the ways of the pile-driver.

The grillage was built in sections and launched and floated in place at high water. Much delay in this part of the work was caused by the difficulty of getting stone, due to ice in the river.

Ten of the special concrete blocks had weights averaging 63 tons; five others weighed 40 tons each; all were set in place by 100-ton floating derrick. Mattresses made of slow setting Portland cement in the proportion of 2½ to 3 of sharp sand to 1 of cement, placed in bagging sheets and lowered into place by divers, were used on top of the low-grade piles, after which the blocks were set upon them. This was done to take up any irregularity in level of the tops of the piles.

There were 71 sewer wall blocks, weighing from 4 to 9½ tons each. These were set by smaller floating derricks, but great delay was occasioned by deposits from the sewer during flood tides, which frequently amounted to 4 ins. in depth. The sewer walls were made continuous by tongued and grooved joints. The cost of landing, handling and locating the 71 sewer-wall blocks was \$19.39 each. This was done by dock builders. The cost of the concrete per cubic yard in the 10 special foundation blocks was \$11.90; in the sewer-wall blocks, \$11.20.

The iron I beams that were used were telegraphed in place by a floating derrick. This "telegraph" consists of a double-drum hoisting engine, a mast or pile-driver ways, some lines and a snatch block. A heavy line is fastened to some distant point about on a level with the depth of the pile driver, and is run over a sheave at the top of the pile-driver or derrick mast and led to the engine drum. A snatch block is then hung on this line between the points of support, to which the load is fastened with a smaller line leading over another sheave next to the first one, then to the second drum of the engine, and the telegraph is ready for use.

PERSONAL.

—Mr. James F. Faulkner, District Claim Agent of the Northern Pacific, died at Helena, Mont., on May 2, of pneumonia.

—Mr. H. P. Taylor, auditor and assistant treasurer of the Cleveland, Akron & Columbus, has resigned, the resignation to take effect June 1.

—Mr. James Roosevelt has been elected Vice-President of the Delaware & Hudson Canal Co., in place of Col. Le Grand B. Cannon, who had held that office for 30 years.

—Mr. Sidney J. Gates, Traveling Passenger Agent of the Louisville & Nashville at Cincinnati, has been appointed Eastern Passenger Agent of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Buffalo, to succeed Mr. S. F. B. Morse.

—Mr. W. H. Stearns, whose appointment as Mechanical Engineer of the Buda Foundry and Manufacturing Co., of Harvey, Ill., was reported last week, was formerly Roadmaster and Superintendent of Bridges on the Chicago & Northwestern Road, and not on the Chicago Great Western, as printed.

—Mr. William H. Phipps, who has been appointed Acting Land Commissioner of the Northern Pacific, has been Land Commissioner of the Chicago, St. Paul, Minneapolis & Omaha for several years, and resigned the latter position to accept the one on the Northern Pacific made vacant by the resignation of Col. C. B. Lamborn.

—Mr. J. N. Faithorn, of Chicago, formerly Chairman of the Southwestern Traffic Association, has been selected by Messrs. W. H. Masters and Richard Lord, representing the New Orleans and Galveston lines, respectively, to act as third arbitrator in the Galveston-New Orleans differential dispute. The arbitrators held their first meeting at New Orleans this week.

—Mr. N. W. Eayrs, M. Am. Soc. C. E., Superintendent of Structure and Interlocking of the Terminal Railroad Association of St. Louis, has been appointed Superintendent of Structure of the St. Louis Merchants' Bridge and St. Louis Merchants' Bridge Terminal Railway also, the latter companies being now controlled and operated by the Terminal Railroad Association.

—The Right Hon. A. J. Mundella, President of the British Board of Trade, has resigned. He has written a letter to his constituents in which he says that he resigned because he was anxious not to cripple the machinery of the department over which he presided. He said that if he occupied any other post under the Government this reason would not have existed, and he would simply have challenged criticism of his own acts. Mr. Mundella represents the Brightside division of Sheffield, and will soon visit that part of the country in order to seek from the electors an expression of their renewed confidence.

—Ex-Senator Joseph H. Ramsey, who died at Howe's Cave, Schoharie County, N. Y., on May 11, at the age of 78 years, was, the latter half of his life, interested in railroad affairs, and particularly with the Albany & Susquehanna Railroad, now a part of the Delaware & Hudson system. It was while he was President of this road that Jay Gould and James Fisk, Jr., tried to secure control of the line, which had been constructed from Albany as far as Binghamton. The final contest in the courts followed in 1870 when, after elections for directors were held by both sides, the Ramsey directors were declared elected. In recent years Mr. Ramsey had promoted a project for a railroad connecting New York with the St. Lawrence River.

—The death of Jesse P. Farley, at the advanced age of 81 years, removes one of the interesting figures in the railroad development of the Northwest. In the early sixties he was President of a Mississippi steamboat company of which James J. Hill was a shipping clerk at St. Paul. In the early seventies he was receiver for the old St. Paul & Pacific, with which J. J. Hill had certain fuel and transportation contracts. Later Mr. Hill became one of the purchasers of the St. Paul & Pacific and the President of the great corporation which succeeded and absorbed it. Mr. Farley spent the last years of his life in pushing a claim against Messrs. Hill and Kittson for a certain proportion of the stock of the Manitoba Co., which he alleged they agreed to give him for helping them to get possession of the old St. Paul & Pacific. The suit was finally decided against him about five months ago by the United States Supreme Court.

—Dr. W. T. Barnard died in Washington, May 9. His death was sudden at last, although it had long been known that he was suffering from tuberculosis, and those who knew him best feared that he would die as he did,—from a hemorrhage taking place while he was about his usual affairs. During the past winter his home has been at East Orange, N. J. With Dr. Barnard's death we lose not only a very acute and energetic mind and a high spirit, but a remarkable amount of unwritten history, for his whole life, from his earliest manhood, had been spent in constant and confidential relations with the foremost men of the country in all positions and callings; and while he had shared to an unusual degree the confidence of the men with whom he had been associated, he had an extraordinary memory. During the war, or at least the later years of the war, Dr. Barnard, then a very young man, in fact a boy, was in the War Department directly under Secretary Stanton. Later he was private secretary to General Belknap, Secretary of War under Grant. He had a great deal to do with the development of the plan of collecting, arranging and publishing the Rebellion Records, a work which will be precious to future historians. Later he was Secretary to President John W. Garrett, of the Baltimore & Ohio Railroad, between 1879 and 1884, when he became assistant to Vice-President Robert Garrett, then assistant to the President a few months later. He was the first Secretary of the Baltimore & Ohio Relief Association and held that office until 1884. When Robert Garrett retired, Dr. Barnard resigned, in 1888, and engaged in various private affairs, not the least important of which was the endeavor to restore his delicate health and he finally went to Chicago as President of the Chicago & South Side Rapid Transit Elevated Railroad. This office he held during the later period of construction, and the first period of operation of that enterprise, which included most of the World's Fair season. It was a peculiarly difficult task to put the Alley road into successful operation under the conditions which Dr. Barnard found; that is, it had to begin running at once with a very crowded traffic, for it began almost simultaneously with the opening of the World's Fair. Besides that, the public which used this railroad had to be taught the most elementary facts as to the possibilities and limitations of an elevated railroad. A great many of the passengers who offered themselves to be carried had a notion that an elevated railroad was something like a street railroad, and that the cars ought to stop anywhere and everywhere, and that people should be permitted to board them and alight from them while in motion, and in general, treated them as the agile citizen of Chicago is in the habit of treating his horse and cable cars. This difficult kind of passenger business had to be handled by men who were almost entirely green to the work, although part of the staff was drawn from New York and Brooklyn, from men who had had some training in elevated railroad work. With these difficulties before him, as well as the physical difficulties of completing and putting into working order the structure, the tracks, the rolling stock and all the complicated apparatus of switching, signaling, heating, electric lighting, and so on, the spring and summer of 1893 was a period of tremendous work for Dr. Barnard, and would have killed many a stronger man. Notwithstanding his fragile health, he was at his office or on the line early and late, rain or shine, Sundays and week days, often sleeping on the sofa in the office, always alert, vigilant and full of energy. The result was that this new road handled a very heavy traffic with no grave accidents whatever, and with very considerable profit. But even Dr. Barnard could not stand this sort of work indefinitely, and in the fall he resigned and went for a while to Southern California, and then to New York, where he spent the greater part of the winter engaged in special investigations of a good deal of importance.

One of his pet ideas was the technical education of railroad employees, and it was under his administration as assistant to the President of the Baltimore & Ohio that the Mount Clare School was organized and very successfully started. The misfortunes of the Baltimore & Ohio, however, put an untimely end to this admirable enterprise, the plan of which was the result of a great deal of very careful study by Dr. Barnard in Europe and in the United States.

Dr. Barnard was a singularly gifted man. We have said that he had a remarkable memory. He had a quick intelligence and had a clear and well-trained mind, with a remarkable analytical faculty. As an investigator of special subjects involving accurate and painstaking research he had few equals. He had considerable power of organization also, and was a man of enthusiasm and fiery energy. With all, he was a high-minded and honorable man. Those of us who knew him well have often regretted that such a brave and capable spirit should have been confined in so fragile a body. Nevertheless, short as was Dr. Barnard's life, and handicapped as he was for years by ill health, he accomplished a great deal more than most of us can ever hope to do.

ELECTIONS AND APPOINTMENTS.

Baltimore & Delaware Bay.—The annual meeting was held in Chestertown, Md., on May 12, and the following directors were elected: Frank L. Hall, J. R. Maxwell, R. W. DeForest, J. W. Watson, S. M. Williams, Samuel Knox and George F. Baker. Frank L. Hall is President, J. W. Watson is Treasurer, and Samuel Knox is Secretary.

Central of New Jersey.—The annual meeting was held in Jersey City, N. J., on May 10, and the following direct-

tors were elected: George H. Baker, Harris C. Fahnestock, Henry Graves, Edward D. Adams, Charles Lanier, James A. Garland, Henry W. Maxwell, J. Rogers Maxwell and Samuel Sloan.

Charleston, Cincinnati & Chicago.—E. F. Gray, General Passenger Agent of the Charleston, Portsmouth & Virginia, has been appointed Traffic Manager of this company, the appointment to take effect May 15. Mr. Gray will retain his connection with the Charleston, Portsmouth & Virginia.

Chicago Great Western.—G. H. Meade has been appointed assistant to the General Manager.

Chicago Great Western.—The headquarters of P. C. Stohr, General Freight Agent, have been transferred from Chicago to St. Paul.

Chicago, Columbus & Southwestern.—This company has been incorporated in Ohio by W. R. Wilcox, F. S. Young, Jr., and F. T. Adams, of New York, and G. C. Gormley, S. C. Lemert and A. T. Wikoff, of Ohio.

Chicago, St. Paul, Minneapolis & Omaha.—Charles P. Nash has been appointed acting local Treasurer, with headquarters at St. Paul, vice Robert W. Clark, resigned. George W. Bell has been appointed Land Commissioner, with headquarters at Hudson, Wis., vice William H. Phipps, resigned, to accept a similar position with another company.

Chicago, Burlington & Quincy.—At the annual meeting held in Chicago, May 10, the old board of directors was re-elected, as follows: John M. Forbes, Charles J. Paine, John L. Gardner, Francis W. Hunnewell, William E. Endicott, Jr., Richard Olney, Boston; T. Jefferson Coolidge, Jr., Manchester, Mass.; Edward W. Hooper, Cambridge, Mass.; John N. A. Griswold and James H. Smith, New York City; Charles E. Perkins, Burlington, Iowa.

Chicago, Peoria & St. Louis.—The stockholders held a meeting at Jacksonville, Ill., on May 12, 28,900 shares, two-thirds of the entire amount of the stock, being represented. Major Bluford Wilson and P. B. Warren, of Springfield, and H. F. Baldwin, of Chicago, were elected directors, to succeed Marcus Hook, Miss Fannie Hook, and William T. Barbee, whose terms as directors have expired.

Cleveland Belt & Terminal.—The annual meeting was held in Cleveland, O., on May 8, and the following directors were elected: A. C. Barstow, Jr., Providence, R. I.; J. H. Buttrick, Lowell, Mass.; J. W. Wardwell and Henry C. Ranney, Cleveland, and Isaac N. Pennock, Minerva, O. Isaac N. Pennock is the only new member on the board. The directors met immediately after the stockholders' meeting and elected A. C. Barstow, President, and Frederick Swift, Treasurer.

Duluth, South Shore & Atlantic.—A. E. Delf, has been appointed Auditor, with headquarters at Marquette, Mich., to succeed Robert Toombs, resigned.

Evansville & Terre Haute.—John Torrence, formerly Master Mechanic, has been appointed Superintendent of Motive Power and Rolling Stock, with headquarters at Evansville, Ind.

Georgia.—At the annual meeting held in Augusta, Ga., May 9, the directors elected were: William M. Reese, H. D. McDaniel, N. L. Hutchins, A. W. Calhoun, Leonard Phinizy, James White, Jacob Phinizy, William A. Latimer, Joel A. Billups, H. H. Hickman, J. H. Alexander, T. W. Coskery, William E. McCoy, R. D. Spalding, George D. Thomas and George A. Speer. Charles H. Phinizy, of Augusta, was elected President.

Kansas City & Atlantic.—The annual meeting was held in Kansas City, Mo., on May 10, and the following directors were elected: Theodore C. Bates and Stephen C. Salisbury, of Worcester, Mass.; Stephen M. Crosby, Francis Armory and E. W. Burdette, of Boston; F. Atwater Barnes, of New Haven, Conn.; John H. Hanson, of Dover, N. H.; Arthur C. Paine, of Portland, Me.; Webster Withers, Walton H. Holmes and Thomas R. Morrow, of Kansas City, Mo. W. F. Burns, of Baltimore, is a director of the Baltimore & Ohio and represents Baltimore interests.

Knoxville, Fair Haven & Mt. Lebanon.—The company has been incorporated in Pennsylvania, with J. T. Grimes, of Knoxville, Pa., as President. The other directors are: Charles W. Provost, Fair Haven, Pa.; Henry Menschke, Geo. C. Smith and James L. McKee, Castle Shannon, Pa.; H. E. Cole, Oak Station, Pa.; James F. Grimes, Albert H. Hunter, Wm. J. Hunter and John P. Moore, of Knoxville, Pa.

Missouri, Kansas & Eastern.—The annual meeting of the stockholders was held at St. Louis, on May 12. This road is operated by the Missouri, Kansas & Texas as its St. Louis entrance. The following directors were elected: Henry C. Rouse, William Dowd, George D. Dana, C. F. G. Meyer, all of New York; J. B. Case, Ellis Wainwright, D. D. Walker, E. C. Simmons, L. B. Tebbetts, S. A. Gore, E. F. Williams, and Marcus Bernheimer, of St. Louis. The directors elected the following officers: Chairman of the Board, Henry C. Rouse; President, E. C. Simmons; Vice-President, Thomas C. Purdy; Treasurer, Charles G. Hedge, and Secretary, George D. Dana.

New England & New York.—The incorporators of this company, which is to succeed the New York & New England, are: Gordon Abbott, Francis P. Lowell, Charles F. Adams, 2d., A. S. Bigelow, Stephen M. Weld, A. C. Tower, T. Jefferson Coolidge, Jr., Henry W. Cannon and John I. Waterbury.

New Paltz & Highland.—The nine directors of this railroad, as named in the articles of incorporation filed in Ulster County, N. Y., are: William H. Price, Daniel A. Hasbrouck, James Hayden, Solomon Deyo, John Schmid, George Rust, G. E. Johnson, of New Paltz, N. Y., and Charles W. H. Arnold, of Poughkeepsie.

New York & Harlem.—The annual meeting was held in New York City on May 15, and the following directors were elected: Cornelius Vanderbilt, William K. Vanderbilt, Frederick W. Vanderbilt, Samuel F. Barger, Chauncey M. Freeman, Dewey C. C. Clarke, John B. Dutcher, Francis P. Samuel D. Babcock, Alfred Van Santvoord, Robert Schell, William H. Robertson and Edward V. W. Rossiter. Mr. Rossiter succeeds John E. Burrill, who died last September.

Ohio River.—At a meeting of the stockholders of this railroad, a West Virginia corporation operating a line between Wheeling and Ceredo, W. Va., held at Parkersburg, W. Va., on May 10, the following directors were elected: E. W. Clark and S. W. Colton, Philadelphia; C. M. Pratt, W. P. Thompson, H. H. Rogers and C. W. Harkness, New York; R. H. Browne, Grape Island, W. Va.; J. G. Fair, San Francisco, Cal.; G. W. Thompson, N. Can-

den; W. N. Chancellor, B. D. Spillman and J. B. Neal, Parkersburg, W. Va. The following officers were chosen: President, George W. Thompson; Secretary, W. N. Chancellor; Treasurer, W. M. Trevar; General Manager, G. Clinton Gardner, and Superintendent, C. L. Williams.

Old Colony Steamboat Co.—A new department is to be created by the New York, New Haven & Hartford Railroad. It will be known as the auditory of the affairs of the Old Colony Steamboat Co., which is now really a part of the railroad. The Auditor will be Charles F. Conn of Boston, who has charge of the department at its present quarters in Boston. His office will be at New Haven, Conn., after June 1.

Ravenswood, Spencer & Glenville.—A meeting of the stockholders of this road, operating a line from Ravenswood to Spencer, W. Va., was held at Spencer, May 10, at which the following directors were elected: William Woodyard, J. G. Schilling, G. H. Stone, E. R. McGugin, J. I. Armstrong, C. A. Crisp and D. W. Chapman. The Board organized by electing William Woodyard, President; J. G. Schilling, Vice-President; D. W. Chapman, Secretary; C. C. Smith, Treasurer.

Winona & Southwestern.—The following are the officers of the Winona & Southwestern Improvement Company recently elected at Winona, Minn.: V. Simpson, President; H. W. Lambertson, Vice-President, and M. G. Norton, Secretary and Treasurer.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Baltimore & Ohio.—This company is now practically rebuilding its Lake Erie Division, 88 miles in length, between Newark, O., and Chicago Junction. This part of the road is being laid with new rails and will be newly ballasted throughout. The bridges, trestles and embankments are all to be strengthened and the line put in first-class condition.

Benwood, McMechen & Moundsville.—Col. Benjamin Wilson, President of this company, which proposes to build an electric railway for carrying both passengers and freight, from Benwood, W. Va., by way of McMechen to Moundsville, W. Va., has received bids from 16 contractors for the construction of the line with power houses and necessary terminal and station buildings. The bids will be opened on May 12. The road is 14 miles in length and will be built this summer. The right of way has been purchased and the surveys made. It will connect directly with the Wheeling Railway and the Wheeling Bridge & Terminal road at Benwood, making a continuous line 19 miles long from Wheeling to Moundsville.

Brazos & Burleson.—The charter for this line was recently secured in Texas by H. K. White, President; William Koppe, Treasurer; W. G. Taliaferro, Secretary and Attorney, of Bryan, who have large plantations in the Brazos Valley, and are anxious for railroad facilities. They propose the construction of a road from Clay Station, on the Santa Fe, to Mosley's Ferry, at Stone City, the terminus of the Hearne & Brazos Valley, on the Brazos River. The proposed road will be 22 miles long, and the country being level, little grading will be required.

Brookline & Milford.—The contract for building this railroad from Brookline to Milford, N. H., has been awarded to Ward Bros., of Kennebunk, Me., and work will be begun immediately.

Burlington & Missouri River.—General Manager Holdrege, in company with several of the directors of the road, arrived in Sheridan, Wyo., last week and gave some attention to the extension from Sheridan to a connection with the Northern Pacific at Billings, Mont. Kilpatrick Bros. & Collins have sub-let portions of the grading to Dunlay & McShane, McDonald Bros., M. Elmore, J. L. Bean and others. The grading on this line was finished a year ago to Paris, on the southern line of the Crow reservation, and the track-laying on this part of the road—about twenty-five miles—will begin by May 15. A local paper says that the contractors are offering \$1.25 a day for common labor, \$1.40 a day for wheel scraper holders, and \$16 a month and board for teamsters. The entire work lies in the Indian reservation. Free transportation will be given the men to the work. Probably 2,000 or 3,000 men will be employed as the work is to be completed by Oct. 15.

Coast Railway of Nova Scotia.—This company has executed a mortgage to secure an issue of bonds for \$900,000. The International Trust Co., of Boston, is the trustee. This company was organized some months ago by A. H. Chadbourne, whose office is at 29 Broadway, New York. The route as projected is from Yarmouth to Lockeport, N. S., about 90 miles.

Chicago, Columbus & Southeastern.—This company filed articles of incorporation at Columbus, Ohio, on May 10. It is projected as a competing line with the Columbus, Hocking Valley & Athens Railroad Co., which is trying to secure possession of the Hocking Canal, under lease from the State of Ohio. It is proposed to build a road having Columbus and Athens as the termini, and passing through the counties of Franklin, Fairfield, Hocking and Athens. The capital stock is fixed at \$500,000. William R. Wilcox, T. S. Young, Jr., F. T. Adams, of New York City; George C. Gormly, Cyrus M. Fisher, W. C. Lemert and A. T. Wickoff are the incorporators.

Florence & Cripple Creek.—The company opened its line for passenger business to Wilbur station, 12 miles out from Cripple Creek, May 6. From this point a stage line will be run to Cripple Creek, connecting with all trains. The line connects at Florence, Col., with the Denver & Rio Grande. About 29 miles of the road is now completed.

French Broad Valley.—The people of Asheville, N. C., are making renewed efforts to secure the completion of the French Broad Valley Railroad from that city out through the French Broad Valley. Madison County is to soon vote upon the question of subscribing \$70,000 of bonds for this purpose.

Knoxville, Fair Haven & Mt. Lebanon.—This company was chartered at Harrisburg, Pa., May 15. The road proposed to be constructed is from Knoxville Borough to the village of Mt. Lebanon, Scott Township, Allegheny County, Penn. The length of the road is five miles; all in Allegheny County. The capital stock is \$50,000. James F. Grimes, of Knoxville, Pa., is President.

Lake Shore & Michigan Southern.—A party of engineers is surveying for a branch from the Franklin Division at Andover to Conneaut Harbor, on Lake Erie. The line is to go through Pierpont and Monroe to the Pittsburgh, Shenango & Lake Erie road, near Conneaut, and then parallel with that road near the harbor and across the creek to the dock grounds of the Lake Shore on the east side.

Little Rock, Hot Springs & Texas.—The following are the contractors on the road between Benton and Hot Springs, Ark., 35 miles; J. H. Barrett, San Antonio, Tex., 3 miles; Johnson & Hanlon, San Antonio, 3 miles; J. E. Collins, Fort Worth, 3 miles; Kennedy & Carter, Summit, Ill., 4 miles; Spencer & Maney, Oklahoma, 10 miles. The company will grade the first five miles by day labor. Under the contracts the work must be completed by August 10. The road is projected to run from Little Rock via Benton, to Hot Springs, Ark., about 60 miles. Uriah Lott is the chief projector, and J. P. Nelson, of San Antonio, Tex., is Chief Engineer.

Long Island.—Work on the extension of the railroad from Port Jefferson, L. I., to Wading River, has been entirely abandoned by the contractor, who, it is said, took the work at such a low figure that he was unable to meet his obligations.

Massillon & Cleveland.—It is stated on the authority of P. G. Albright, a director of the company, that this road, which is operated by the Pennsylvania Company will be extended from Clinton to Hudson, O., thus securing a direct route to Cleveland. Mr. Albright also states that the Massillon & Cleveland road will be extended through the Massillon bituminous coal field to the southwest. Within the past few weeks surveys have been made between Clinton and Akron, O.

Minneapolis, Anoka & Northern.—The project of building a narrow gauge road from Minneapolis to Anoka has been revived by this company. An attempt has been made to secure the right of way for its tracks over certain streets in Minneapolis, but the City Council has not as yet made the concession.

Mountain Valley Coal & Coke Co.—John E. Lacy, of Jasper, Ala., has been awarded the contract for grading for two miles of a branch road of the Mountain Valley Coal & Coke Co., which will intersect the Georgia Pacific by connecting with the Coal Valley branch. The company for which the road is being built is rapidly opening its mines.

Montreal & Ottawa.—The Canadian Pacific Railroad Co. is taking steps to secure the completion of this road to Ottawa, Ont. It is said the company will build the road as far as Caledonia Springs this summer, and complete the remainder next year.

New Roads.—A survey is being made for a proposed steam railroad from Bar Mills to Limerick, Me. It is said that Jerry Mason & Son, of Limerick, have offered to subscribe \$75,000, and that Portland capital is also interested.

Palisades.—This railroad, built along the top of the Palisades, north of Weehawken, N. J., has been opened for traffic as far as Fort Lee. It is a double track line about six miles long. The new road was built principally by the owners of property in the region through which it passes. The charter under which the new line operates was granted 20 years ago, but the building of the railroad commenced less than two years ago. It is intended to extend the new line to Alpine, which is about four miles beyond Englewood, N. J. Only a single track will be built beyond Fort Lee. The North Hudson Count Co. is to operate the line to Fort Lee.

Philadelphia & Frankford.—The rock excavation and grading of the new Frankford branch of the railroad at Second street, Frankford, have been completed. It now remains only to level up in places along the line before laying the tracks and sidings. It is believed that the road will be in operation by July 1. Bids have been received for the new station on Main street, Frankford, and the contract for building will be awarded during the present week.

Queen Anne's.—The stockholders met at Centreville, Md., recently, and chose directors and W. H. Bosley President, and W. W. Busted, Secretary. The success of the project, it was reported, is apparently assured. The route has been surveyed from Queenstown to Chestertown, Md. The Maryland Legislature at its last session authorized the county commissioners of Talbot county to exempt the railroad from taxation for 20 years should the line be extended into Talbot county.

Sheboygan, St. Paul & Central.—This company was incorporated recently in Wisconsin to build a road southwest from Sheboygan, Wis., to the Wisconsin Central line. The capital stock is \$250,000. The incorporators are Chicago capitalists.

Southern Kansas.—The contract has been let for grading the extension of the Southern Kansas branch road to Hunnewell, Kan., from that place, the present terminus, to Rock Falls by the way of Parker, Ok. The Atchison, Topeka & Santa Fe Co. will lay the rails and operate the road as soon as the grade is completed.

South Pennsylvania Railway & Mining Co.—The receivers appointed by the Fulton County Court in response to the petition of President T. B. Kennedy, have gone over the abandoned route of the South Pennsylvania from Tuscarora Tunnel, 13 miles west of Chambersburg, to Mt. Dallas, Pa., and on May 11 reported to the court at McConnellsburg, accepting condemnation and assessing the damages to the South Pennsylvania at \$2,800. It is thought this extension from the Cumberland Valley at Richmond Furnace to Mt. Dallas, will be built in the near future.

Toledo & Ohio Central Belt Line.—Outside of surveys for this belt line at Columbus, O., nothing has as yet been done. The officers were ready to begin work, but opposition by west side citizens to the plan to have the tracks cross Broad street has developed, and it is not known how much delay this will cause.

Union, (Pa.)—Nearly 1,000 men are at work at the Edgar Thomson Steel Works at Braddock, Pa., building a railroad about the plant. It will be double-tracked, and will be about six miles long. It is to facilitate getting shipments in and out of the plant.

Wheeling Bridge & Terminal Co.—On Friday last the final work on the extension of this line from Wheeling, W. Va., to Benwood, W. Va., was finished, the road having been opened a week before. The receiver, Mr. C. O. Brewster, under authority of the United States Court, will at once begin work upon the extension through Benwood, to the plant of the Wheeling Iron & Steel Co., one of the largest shippers in the Ohio Valley. The extension so far has cost nearly \$100,000, and the part to be done will cost nearly half as much more.

GENERAL RAILROAD NEWS.

Atchison, Topeka & Santa Fe.—The following table gives the earnings and expenses of the Atchison, Topeka & Santa Fe system, and of the entire system for the

month of March, and for the nine months of the fiscal year, compared with the same period of last year:

Month of March.	1894.	1893.	Dec.
Average operated mileage . . .	7,480	7,480	
Gross earn	\$2,649,816	\$3,341,577	\$691,761
Oper. expen	2,214,523	2,523,481	308,958
Net earn	\$435,293	\$818,096	\$382,803
Nine months to March 31.			
Average operated mileage . . .	7,480	7,480	
Gross earn	\$26,909,302	\$31,201,718	\$4,292,416
Oper. expen	18,955,430	21,807,975	2,852,545
Net earn	\$7,953,872	\$9,393,743	\$1,439,871

AGGREGATED GENERAL SYSTEM.

Month of March.	1894.	1893.	Dec.
Average operated mileage . . .	9,344	9,344	
Gross earn	\$3,284,578	\$4,130,539	\$845,961
Oper. expen	2,681,896	3,059,946	378,050
Net earn	\$602,682	\$1,070,593	\$467,911
Nine months to March 31.			
Average operated mileage . . .	9,344	9,344	
Gross earn	\$32,909,483	\$38,415,747	\$5,506,269
Oper. expen	23,078,257	26,413,577	3,335,320
Net earn	\$9,831,226	\$12,002,170	\$2,170,949

Cresson, Clearfield & New York Short Route.—The Pennsylvania Railroad has purchased this railroad, a line 30 miles long, which has been operated as a part of the Pennsylvania's Altoona Division. The line was leased by the Pennsylvania on Jan. 1, 1893, and that company owns a majority of the capital stock, and also has an interest in the bonds. The road was recently sold at foreclosure to the Pennsylvania's representative.

Illinois Central.—The income from traffic for the nine months ending March 31, compared with the same period of last year, is given in the following table:

Miles operated . . .	1894.	1893.	Increase.
2,888	2,888		
Gross earn	\$16,544,832	\$14,860,280	\$1,684,552
Oper. exp. and taxes. 11,161,177	10,785,122	376,055	
Net earn	\$5,383,655	\$4,075,158	\$1,308,497

The gross receipts from traffic for the month of April, 1894, are estimated at \$1,312,403. The receipts for April, 1893, were \$1,542,998.

Being an estimated decrease of . . . \$230,595

Indianapolis, Decatur & Springfield.—Mr. George Sherman, Secretary of the Central Trust Co., representing the first mortgage bondholders, bought the Indianapolis, Decatur & Springfield Railroad at foreclosure sale in New York on May 17, for \$1,800,000. The road was sold a year ago, but the plan of reorganization having failed, the purchasers did not comply with the terms of the sale. At the former sale the property was purchased by the second mortgage bondholders' committee. An agreement for the lease of the property to the Cincinnati, Hamilton & Dayton was made, and new bonds were to be issued with that Company's guarantee, but the arrangement was abandoned during the summer. Protests against the sale have been made by the second mortgage bondholders.

Kansas City Elevated.—This property has practically passed into the control of the Metropolitan Street Railway Co., of Kansas City, which has secured a majority of the bonds of the elevated road. The company has a capital stock of \$2,600,000, and was bonded for a like amount. This purchase gives the Metropolitan a monopoly of the travel between Kansas City, Mo., and Kansas City, Kas.

Litchfield, Carrollton & Western.—In the United States Court at Litchfield, Ill., on May 9, in the case of the Metropolitan Loan & Trust Co. against this company, a foreclosure proceeding, Judge Allen has appointed C. H. Bosworth, of Litchfield, receiver, vice Henry C. Carroll.

Marietta & North Georgia.—No bid was received for the property at the foreclosure sale at Marietta, Ga., on May 8. Another date will be set for the sale, when the Reorganization Committee will be ready to purchase the railroad.

Mexican Central.—The annual meeting of stockholders was held at Boston last week, and resulted in the re-election of the present management. President Robinson was chairman of the meeting, and in a few remarks referred to the business depression and the effect that the low price of silver had upon earnings last year, although the latter were larger than in 1892 on a silver basis. The income from importations of corn was cut down \$325,000 from 1892, owing to the depreciation of silver. He referred particularly to the local business of the road, and in speaking of supplies he said that the policy would be to purchase as much in Mexico as was possible, owing to the less cost, and as it tended to further develop local traffic. The contracts for coal would be made largely in the United States, he said, at least \$50,000 a year could be saved rather than buying abroad as had been done. The cost of labor in Mexico is at least 50 per cent. cheaper than it is in this country, and, consequently, operating expenses are liable to less change than gross income. A large smelter is being constructed on the line of the road for smelting copper ore. A contract has been entered into by the Mexican Central road for carrying the matter to seaboard for exportation. The road was operated for 64 per cent. of its gross earnings last year, and with this low percentage it was only a question of a short time when charges could be fully earned, providing traffic increased, as it surely must. An advance in railroad rates has received serious consideration, and the experiment is now being tried by the Mexican Southern road; at least they have made application to the government, and the government is considering the proposition. "I have," Mr. Robinson said, "reached the conclusion that it is impracticable; the result would be the same as in the United States, in that it would cut off business and cut off industries that we want to build up. We have raised rates a fraction, but a further advance, I think, would do more damage than good."

Norfolk & Western.—The Board of Directors has sold 20,000 shares additional of the preferred capital stock of the Company, being the remainder of the shares authorized by the shareholders at the meeting held May 4, 1892. This additional issue is for the purpose of reimbursing the Company for advances made by it out of its earnings in the acquisition of the capital stock of the Columbus Connecting & Terminal Railroad, and for other expenditures properly chargeable to capital accounts.

Northeastern Elevated (Philadelphia).—The section of elevated railroad structure placed in position on North Front street, by the Northeastern Elevated Railroad Company, will be torn down in the near future, in consequence of the adverse decision of the Pennsylvania Supreme Court, which forfeited the company's charter.

Pennsylvania, Poughkeepsie & Boston.—Counsel for the Holland Trust Co. of New York has filed a bill in equity in the United States Circuit Court at Philadelphia, asking for a decree in Pennsylvania to foreclose the mortgage of this railroad company. The road is now in the hands of Henry H. Kingston, as receiver of the property.

Quaker City Elevated.—At a meeting in New York last week of the officers of the Quaker City Elevated Railway Co. with the bankers, who have been interested in the project, it was determined, in view of the decision of the Pennsylvania Supreme Court, to wind up the business of the corporation and distribute its assets among the stockholders. President Buchholz, replying to a question as to the practicability of endeavoring to obtain adequate legislation, said that the subject had been talked over at some length, and the conclusion arrived at that as so much money had already been expended, and as the company would be compelled to lay out a large amount to obtain such legislation, it would be best to give up the project.

South Carolina.—Charles Parsons, formerly President of the Rome, Watertown & Ogdensburg, and of the New York & New England Railroads, and his brothers, George and Edward, have bought the South Carolina Railroad from the purchasing committee representing the first mortgage bondholders, and will carry out the plan of reorganization. The new company will be called the South Carolina & Georgia Railway Co. The plan of reorganization of the company, approved by the holders of the first consolidated mortgage bonds, provides for an issue of \$5,250,000 of five per cent. bonds. For each old bond 10 per cent. in new stock will be given.

Western New York & Pennsylvania.—About \$9,600,000 of the second mortgage bonds of the company have been deposited under the plan of reconstruction. As it needs less than \$500,000 more to make the plan operative, and as there are several large holders who have expressed their intention of depositing, the officers express no doubt that a sufficient number of the bonds will be deposited to make the plan operative.

TRAFFIC.

Traffic Notes:

A special train for the business of the United States Express Co. is now run through from New York to Chicago over the Delaware, Lackawanna & Western, and the Lake Shore & Michigan Southern, in 25 hours.

The Southern Railway & Steamship Association, at its annual meeting in New York last week, renewed the agreement, which expires July 31, with slight changes. The revised form is now being prepared for signatures.

The sleeping car service between St. Louis and Boston, over the Wabash, the Fitchburg and connections, will be restored on May 20; but the new train between St. Louis and Boston, over the Big Four, which the agents of that road have been talking about, is postponed indefinitely.

It is reported that the Lehigh Valley has agreed to withdraw the large number of its tickets said to be in the hands of scalpers, and disturbing the Trunk Line rates, and that the passenger rate situation is, therefore, improved; but Vice-President Garrett, of the Lehigh Valley, talks as though his road had not yet made any important concessions.

The Manufacturers' Exchange, of Denver, Col., recently met to consider the serious disturbance of business in that State, on account of the great reductions in freight rates from the East, and resolutions were passed looking to the formation of a pool among merchants, the intent being to order their goods shipped from the East by the different railroads in equitable proportions, the committee in charge to be authorized to withhold shipments entirely from any road injuriously disturbing rates.

The Interstate Commerce Commission has held a hearing at Titusville, Pa., to take testimony concerning the extent to which the railroads have discriminated in oil rates. This matter was the subject of a decision by the Commission several years ago in favor of the independent refiners, and against the Standard Oil Company, and the present proceeding is in the nature of an assessment of damages.

Chicago Traffic Matters.

CHICAGO, May 16, 1894.

The eastern situation is dwarfed by the magnitude of the rate disturbances existing in all territory west and southwest of the Mississippi River. Beginning with the reductions in rates to Colorado common points, noted last week, the reductions have spread so widely and with such rapidity that it is almost impossible to record the exact situation. The following partial tabulation of new and old rates tells the story of the whole Western situation.

	1	2	3	4	5	A	D	E
Chicago to Mo. River . . .	Old 75	60	42	30	25	30	17½	16
Do.	New 35	30	20	15	12½	15	12½	12½
Miss. River to Mo. Riv . .	Old 55	40	32	25	20	22½	12½	11
Do.	New 15	10	10	7½	7½	7½	7½	7½

The Missouri Pacific on May 14 made rates from Chicago to Colorado common points, Trinidad to Denver inclusive; lumber 23½; cereal products, 25; matches, 15. Also announced a reduction on agricultural implements from St. Louis to Texas points from 68 cents to 25 cents, to meet similar rates by the Missouri, Kansas & Texas.

The Atchison also made reductions of 25, 50 and 60 per cent. in commodity rates from Chicago to Texas common points. In packing house product rates reports are current that as low as 11 cents per 100 lbs. from the Missouri River to Chicago is being offered, the regular rate being 22 cents.

But the gravity of the situation has already had its effect, and the presidents of the Northwestern, the Alton, the Burlington, the St. Paul, the Chicago, Great Western, the Rock Island and the Illinois Central yesterday agreed to restore all freight rates May 26. The Missouri Pacific, the Atchison, the Union Pacific and the Wabash promise to co-operate, provided action is taken to insure the permanence of tariffs. A meeting of presidents has been called for May 23, and unless differences as to details arise at this meeting, the prospect for restoration is good. The gravity of the Western and Southwestern situation overshadows the Northwestern, which is reported to be equally bad. Flour rates from St. Paul to Boston by the Soo line are cut to 18 and 17½ cents, which completely shuts out the St. Paul-Chicago rail lines. They have not yet determined to meet this competition, however.

Denver merchants are complaining bitterly against the reductions, which unsettle values and threatens to demoralize their entire jobbing trade. Jobbers in Iowa are also up in arms, and the State Board of railroad commissioners threatens to order wholesale reductions in local rates to equalize matters, unless through rates are speedily restored.

Western passenger matters remained practically at a standstill last week, owing to the absence from the city of representatives of the Atchison. The meeting reconvened yesterday, and the whole subject is now being gone over again. The Union Pacific and the Atchison have practically agreed to a revision of percentages on the immigrant business, the Atchison conceding something to the Union Pacific, in return for which that company agrees to give orders to Agent McDonald to turn all its contract business through the association clearing house. The hitch now appears to be on the question whether this matter shall be settled independently of the other questions of regular rates and excursion rates, some of the other lines desiring to have all matters of difference rounded up at the same time. The Atchison is unwilling to agree to this until the bars are all up west of the Missouri River, as the absence of the Union Pacific from the Western Passenger Association makes it necessary for the Atchison to protect its rates west of the river.

All the Eastern lines are keeping quiet, awaiting the result of the arbitration on percentages. As there is only 10 per cent. of difference between them, the outlook is hopeful that the award of the arbitrator will be satisfactory, and that the new agreement will be promptly put into working order. The agreement requires each line to limit its carriage of eastbound freight, including dressed beef and live stock, to the percentage awarded it by the arbitrator. If this is found impracticable, the equalization is to be effected, either by the line in excess temporarily advancing its rates, or the line in deficit reducing its rates, or by an actual diversion of tonnage from the line in excess to the line in deficit. The only provision which is likely to cause friction is that the award of the arbitrator is to be retroactive (to May 1).

No progress has been made towards the adoption of the eastbound passenger agreement, the Big Four declining to become a party.

At the meeting of the Freight Committee of the Central Traffic Association last week the Classification Committee was authorized to make a carload rating at fourth class on hardware; milling in transit rules were amended to include the privilege of billing mixed carloads, the rate applicable on the higher class to govern on the carload shipment, and a uniform charge of \$2.50 per ton on ice used in re-icing cars in transit was agreed to. The Soo Line has issued a tariff effective May 15, quoting passenger rates from Chicago to San Francisco and Puget Sound points, \$7.50 1st class and \$5.2d class, lower than the transcontinental rates.

The Chicago-Ohio River Association has now been fully re-organized, and all traffic, both freight and passenger, has been placed in the hands of Commissioner Tucker. Among the provisions of the agreement is one prohibiting any member from having any dealings with ticket brokers.

The Rock Island will meet the rate of \$15 for the round trip made by the Union Pacific from the Missouri River to Denver for the conventions of the Homoeopathic Association, Mystic Shriners and American Wheelmen.

An emergency rate of \$22 per net ton on coal has been made from Duluth, Ashland and West Superior to Chicago, expiring May 31, to enable the surplus coal at those ports to be moved.

Western lines are after the Pittsburgh, Akron & Western and Cleveland, Canton & Southern, charging them with stocking scalpers at St. Louis, Indianapolis, and other points with tickets which are demoralizing rates. The General Passenger Agent of the Pittsburgh, Akron & Western promises to clear the market of his tickets forthwith.

As has been already noted in these columns, the Western lines terminating at Chicago, and at junction points in Illinois, recently gave notice to their eastern connections that after May 22 they would not submit to the deduction of terminal charges, such as the usual lighterage charge of 3 cents per 100 lbs. in New York harbor, before prorating the through rate on eastbound freight, as has been customary for several years. This notice only applies to freight originating on the Mississippi River, and at points in Illinois east of the Mississippi River, trans-Mississippi business being excluded. The Western roads originating business on their own lines claim to be entitled to protection on their short hauls, and refuse longer to participate in the deduction of lighterage or of short haul terminal charges in the Eastern States, alleging that there are some 10,000 instances where deductions of from 2 to 5 cents are constantly made, before dividing the through rate, and that freight is often billed to such points when, in fact, its destination is some point where no such deduction can be claimed. A conference was held which resulted in no agreement, and the Central Traffic lines replied, taking the position that this subject is part of a general exchange of traffic under the agreement, comprising what is known as the Joint Rate Committee, and that the Western lines had no right to undertake to deal in such a manner with a single feature of the agreement, by which they were bound as a whole. The Western lines have declined to change their position, and have given notice that they will not participate in through rates on the old basis, on the traffic referred to, on and after May 22. The Central Traffic lines will have to come to some agreement with their Eastern connections (the Trunk lines) before they can take any action either way, so that the prospect seems to be that for some time this freight, originating at interior Illinois points, will have to pay local rates from the starting point to the junction with the Eastern line.

Other Chicago Traffic News will be found on Page 360.

The shipments of eastbound freight, not including live stock, from Chicago, by all the lines for the week ending May 12, amounted to 52,856 tons, against 55,779 tons during the preceding week, a decrease of 2,923 tons, and against 58,390 tons for the corresponding week last year. The proportion carried by each road was:

Roads.	W'tk to May 12.		W'tk to May 5.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	5,570	10.5	4,922	8.8
Wabash	5,787	11.0	5,323	9.5
Lake Shore & Mich. South .	8,382	15.9	7,665	13.6
Pitts., Ft. Wayne & Chicago.	4,452	8.4	7,380	13.2
Pitts., Cin., Chicago & St. L.	5,789	11.0	7,004	12.6
Baltimore & Ohio	3,260	6.2	2,322	4.2
Chicago & Grand Trunk . . .	7,522	14.2	7,737	13.9
New York, Chic. & St. Louis	4,871	9.2	6,816	12.2
Chicago & Erie	5,250	9.9	4,940	8.9
C. C. & St. Louis	1,973	3.7	1,730	3.1
Totals	52,856	100.0	55,779	100.0

Of the above shipments 1,615 tons were flour, 24,116 tons grains and millstuff, 7,558 tons cured meats, 10,567 tons dressed beef, 1,319 tons butter, 1,051 tons hides and 5,336 tons lumber. The three Vanderbilt lines carried 35.6 per cent., the two Pennsylvania lines 19.4 per cent. Lake lines carried 54,875 tons, against 101,989 tons last week.